UNIVERSITY OF KWAZULU-NATAL

BENEFITS AND CHALLENGES OF PROVIDING SUSTAINABLE LOGISTICS: A CASE AT A SOUTH AFRICAN LOGISTICS COMPANY

By

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I Babongile Mabhena declare that

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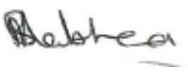
Signature: 

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ABSTRACT

The logistics industry particularly in South Africa is growing rapidly offering various new opportunities. However, with that growth, there is an increase in carbon emissions which cause environmental concerns in the country. As a result, logistics companies in South Africa and all around the world are waking up to the green movement.

Sustainable logistics has attracted growing consideration with the binding pressures from environmental and social requirements. The study aims to answer the following research questions:

- What is the motivation behind Transport Company X providing sustainable logistics?
- What benefits does Transport Company X derive from providing sustainable logistics to its customers?
- What are the challenges that Transport Company X experiences in providing sustainable logistics to its customers?
- How does Transport Company X overcome these identified challenges?

Exploratory and descriptive research was used to collect qualitative data at one of the logistics and transportation companies in South Africa. Semi-structured interviews with open-ended questions were conducted. A non-probability, purposive sampling method was used to select six participants from the target population of senior management and team leaders. Sound recordings of the interviews were transcribed and then analysed using content analysis.

The findings describe the current sustainable logistics practices of this company. Cost savings and retaining of customers contribute to the main reasons behind providing sustainable logistics. Due to these cost savings the company is able to benefit through a competitive advantage of offering a lower rate to their customers, which has also attracted new customers. However, the participants did raise concerns pertaining to the fact that certain stakeholders lack discipline and are not complying with the sustainable logistics the company is trying to implement. The participants also stressed that sustainable logistics is only beginning to gain attention in South Africa; therefore, there is a major need for more training to create awareness of a green, sustainable culture within the industry.

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CHAPTER 1

INTRODUCTION AND BACKGROUND TO THE STUDY

1.1 INTRODUCTION

Logistics is the storage of stock and transportation of that stock from the supplier to the end consumer. Kumar Rajuldevi, Veeramachaneni and Kare (2008:10) define logistics as "the management of the flow of goods, information and other resources, including energy and people, between the point of origin and the point of consumption in order to meet the requirements of consumers. It involves the integration of information, transportation, and inventory, warehousing, material-handling and packaging". As sustainability concerns increase, logistics now incorporates return logistics of defect products for recycling and reuse, or proper disposal (McKinnon, 2010:13). Thus reverse logistics is also a factor of environmental concern in companies today.

Sustainability is encouraged in the entire supply chain because of environmental factors. The term sustainability has been previously expressed as "never harvesting more than what the forest yields in the growth" (Kuhlman & Farrington, 2012:3437). This simply means the ability or capacity of something to be able to maintain or sustain itself. It is the use of certain current resources in a way that will not jeopardise their use in the future (Ciegis, Ramanauskiene & Martinkus, 2009:29). The United Nations (2010:5) explain sustainability as the control of the three spheres of sustainability on the environment and the motivation of the use of clean processes throughout the lifecycle of products or services.

Sustainability today ensures that businesses do not consider only themselves but also the needs of their target markets. It also ensures that businesses are ethical in the way they operate (Chitakornkijsil, 2012:316). In other words, the way they dispose of their end products should be consider how society will react in terms of environmental factors. When a company is sustainable it also helps it to achieve cost benefits in materials, energy and transport (Milne & Gray, 2012:13). Companies try to achieve sustainability by reducing waste. Van der Wiel, Bossink and Masurel (2012:97) suggest that scrap materials must be gathered and treated as "food" or components for reuse or new production. That is companies should strive to reduce or minimise waste by recycling it. This is recovering old products to produce new ones without losing the value of the product.

McLuhan (2010:34) points out, that in as much as logistics brings about economic growth globally, it also needs to uncover ways of reducing carbon emissions and achieve sustainable transportation. Sustainability in logistics refers to procedures and steps introduced into the system to minimise carbon emissions or any other environmentally unfriendly effects. These steps are taken on products or services from their point of manufacture through to warehousing and distribution and finally to the point of the end consumer (Henry, 2014:paragraph 2).

Against this background, the aim of this study was to find out the motivation behind Transport Company X (a pseudonym) providing sustainable logistics. In addition, the aim was to determine the benefits and challenges that Transport Company X faces in its provision of sustainable logistics, and how they overcome the identified challenges.

This study focuses on Transport Company X, a logistics provider, that has various divisions working together to provide an effective and efficient logistics system.

1.2 BACKGROUND OF THE RESEARCH STUDY

Lysons and Farrington (2012:407) define sustainability as satisfying present needs without weakening future needs. Being sustainable is a goal that most industries try to achieve. This helps create the company's image and reputation. Another factor that encourages sustainability in industries is the issue facing the world today: global warming. Global warming, results from the burning of fossil fuels (Sen, 2009:98).

As part of sustainability, environmental, social and economic factors are considered. In this study, focus is on the sustainable logistics provided by Transport Company X. The study looks at the steps that the company has taken to reduce the negative impact caused by forward and reverse logistics on the environment. For example, companies should strive to reduce their fuel consumption which will result in the reduction of carbon emissions, thus saving the environment. They could also introduce the use of solar panels in their warehouses which will result in savings in energy usage and use hybrid vehicles and/or lighter vehicles to reduce carbon emissions and noise pollution. Creation of close relations with partners is also vital so as to work together towards achieving sustainability (United Nations Environment Programme, 2009:1).

Transport is the movement of inventory from its raw material stage to finished goods, parts or services from supplier to end consumer. Tseng, Yue and Taylor (2005:1658) define it as part of the supply chain process that organises, implements, and controls the efficient, effective forward and reverse flow and storage of goods, services and related information between the point of origin and the point of consumption in order to meet specific customer requirements. The transportation activity involves managing the movement of goods and services, which is choosing the right mode of transport (air, water, rail, pipeline, and road), also selecting the route, and obeying all transportation rules and regulations domestically and internationally (Stock & Lambert, 2005:25).

In order for Transport Company X to achieve customer satisfaction, the company has to meet certain requirements that its target market deems vital in its transportation. Bowersox, Closs and Cooper (2010:28) note that there are three vital elements in transport implementation, namely cost, speed and consistency.

Cost is noticeable in transport. Transportation of products between locations and maintenance of in transit stock will acquire some expenses. McCann (2001:671) points out that transportation costs usually diminish with increasing haulage distance. The company has to come up with a transportation method that is effective and efficient to meet consumer needs and is also cost effective. However, using moderately less expensive transportation may not necessarily mean lower costs will be incurred. This can arise due to fact that inefficient transportation could increase transportation costs (Bowersox *et al.*, 2010:25).

Speed refers to the lead time. Speed and cost are interrelated. A transportation organisation that is capable of offering the service or the good within a short period of time will be more expensive as compared to the one that takes a longer period of time. Speedy transportation service means shorter lead times; hence the organisation has less chance of experiencing damages of inventory while in transit or paying for any delays. A balance of speed and cost must be maintained to achieve overall low costs within the organisation. Thus, it is of utmost importance for a company to know the most efficient and effective suitable transport service it can provide (Bowersox *et al.*, 2010:25). Besides costs, transit time is a concern, shorter time means a more suitable method of transportation (Hu, Zhang & Lim, 2016:20).

Consistency refers to the regular time intervals taken to complete shipments (Bowersox *et al.*, 2010:26). Consistency is important as it helps build trust between the company and the company customers and also variance in time will endanger the products. It shows reliability.

1.3 DEFINITION OF TERMS AND CONCEPTS

Certain terms and concepts are used throughout this study. Table 1 provides definitions of the key terms and concepts used.

Table 1: Definition of Terms and Concepts

Terms and Concepts	**Definition**
Motivation	Motivation is referred to as a reason or reasons for behaving or acting in a particular way. Reasons behind provision of sustainable logistics in this study "are desire to do the right thing, pressure from customers, desire to attract green customers and competitive pressures" (Halldorsson & Kovacs, 2010:7). Furthermore, LaGuardia and Srinivasan (2011:1240) point out "value of the brand, misuse of resources, government intervention and international standards and regulations" as additional motivations behind provision of sustainable logistics.
Benefit	The Oxford Dictionary (2017:122) describes a benefit as an advantage, profit or gain from something. In the context of this study, a benefit can be defined as a gain that organisations obtain from providing sustainable logistics.
Challenge	A challenge can be something new and difficult, which could require great effort and participation. In this study Petala *et al.* (2010:175) state that organisations experience various challenges when implementing sustainable practices in the foundation stages of their new product development process. These are explained in detail in the literature review.
Logistics	Christopher (2016:5) defines logistics as "the process of tactically managing the procurement, transportation and storage of materials, parts and finished inventory, including related information flows through the organisation and its marketing channels in such a way that current and future profitability are maximised through the cost-effective fulfilment of orders". Furthermore, logistics management is serving customers in the most cost-effective way.
Sustainability	The theory behind sustainability was first brought up in forestry, where it meant "never harvesting more than what the forest can yield"

	(Kuhlman & Farrington, 2012:3437). Sustainability is later defined by Morelli (2012:2) as the "development that meets the needs of the present without compromising the ability of future generations to meet their own needs".
Sustainable Logistics	In the beginning sustainable logistics has been defined as "that which does not risk public health or ecosystems and that which meets needs for access consistent with (a) use of renewable resources that are below their rates of regeneration, and (b) use of non-renewable resources that are below their rates of development of renewable substitutes. Sustainable logistics is also a system in which fuel consumption, vehicle emissions, safety, congestion, and social and economic activities are of such levels that can be accessed and sustained into the indefinite future" (OECD, 2001:18).

1.4 RESEARCH PROBLEM/ STATEMENT OF THE PROBLEM

Sustainable logistics has attracted growing consideration with the binding pressures from environmental and social requirements (National Planning Commission, 2012:18). It is vital for companies to practise sustainable logistics so as not to harm the environment and to maintain a client base. A significant number of customers in today's world only associate themselves with companies that practise green operations (Wichaisri & Sopadang, 2014:979).

Against this background, this study aimed at providing insight as to the motivation behind Transport Company X implementing sustainable logistics, the benefits derived from it and the challenges experienced from providing sustainable logistics. The study further aimed to provide insight into how the Transport Company X overcomes the identified challenges. This was achieved through secondary research – a review of relevant literature - and primary research through conducting interviews with certain participants at Transport Company X. Studies on the benefits and challenges of sustainable logistics in the South African transport industry are limited. Therefore, it is envisaged that the findings and recommendations of this study will contribute to the existing body of knowledge by identifying areas through which sustainable logistics in the transport industry in South Africa can be improved.

In light of the importance of sustainable logistics, the following problem statement was formulated:

To identify the benefits and challenges of providing sustainable logistics: A case at a South African logistics company.

1.5 THEORETICAL FRAMEWORK

The theoretical framework (Figure 1) underpinning this study focuses on the different strategies that lead to sustainable logistics. This framework was the lens that guided this study. The theoretical framework includes the different strategies that companies implement in their businesses in order to achieve logistics that meet the sustainable requirements of their customers. Certain advantages and challenges of sustainable logistics are presented in the findings of this study.

1.5.1 Logistics

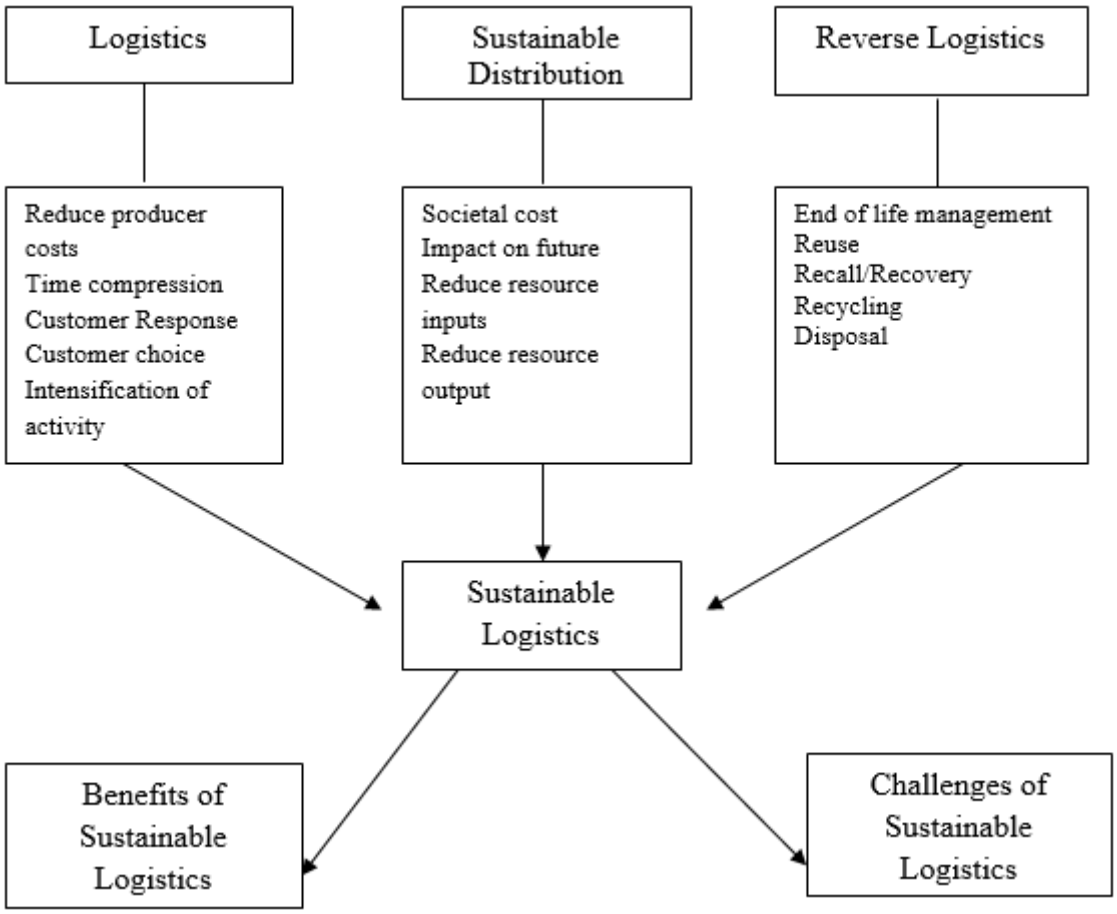
Logistics is the movement, handling and storage of products or services from their point of origin to their final destination. (McKinnon, Browne, Piecyk & Whiteing, 2015:3).

Fernie and Sparks (2014:4) point out that logistics consists of five components which are: (1) storage facilities, (2) inventory, (3) transportation, (4) unitization and packaging and (5) communication. These components are all inter-linked.

1.5.2 Sustainable distribution

Gudmundsson, Hall, Marsden and Zietsman (2016:5) define sustainable distribution as "any means of transportation or moving goods or products between the supplier and the consumer with the lowest possible impact on the ecological and social environment, and it includes the whole distribution process from physical transformation, storage and warehousing, packaging, labelling, improved vehicle loadings and reverse logistics".

Figure 1: Strands of Sustainable Logistics



Adapted from: Rodique, Slack & Comtois (2009)

1.5.3 Reverse logistics

Reverse logistics handle different issues such as remanufacturing, refurbishing, recycling, reuse or disposal to use resources effectively (Nylund, 2012:15). Dekker, Fleischmann, Inderfurth and Van Wassenhove (2013:5) define reverse logistics as "the logistics management and disposing of hazardous and non-hazardous waste from packaging and products. It includes reverse distribution, which causes goods and information to flow in the opposite direction of normal logistics activities". Reverse logistics looks at four essential viewpoints, namely:

- *Why* goods or products are returned;
- *How* reverse logistics actually works;

- *What* goods or products are being returned; and
- *Who* is in charge of implementing reverse logistics activities?

1.5.4 Benefits of sustainable logistics

Sustainable logistics does not only make the organisation gain financially, but it is also important for the action of the environment (Modrak & Bosun, 2014:68). Implementation of sustainable logistics in an organisation allows the company to have a competitive advantage over its competitors, increasing value for the stakeholders and shareholders. This makes the organisation attractive to potential investors and allows for better synchronisation and integration on activities internally (Dima, Grabara and Modrak, 2014:149).

1.5.5 Challenges of sustainable logistics

Time and flexibility are important factors of modern logistics. Short lead-times can be achieved through increased speed, which increases pollution and energy consumption drastically. In order to achieve flexibility, logistics providers use door-to-door and just-in-time strategies, which increase the pressure to use road transportation (the least environmentally friendly mode of transport) (Beajkovnik & Jakomin, 2010:154).

1.6 RESEARCH QUESTIONS

The research questions for this study are as follows:

- ❖ What was the motivation behind Transport Company X providing sustainable logistics?
- ❖ What benefits does Transport Company X derive from providing sustainable logistics to its customers?
- ❖ What are the challenges that Transport Company X experiences in providing sustainable logistics to its customers?
- ❖ How does Transport Company X overcome these identified challenges?

1.7 RESEARCH OBJECTIVES

This section outlines the objectives of the study. The objectives of this particular study can be summarised below as follows:

- To provide insight into the motivation behind Transport Company X providing sustainable logistics.
- To identify the benefits that Transport Company X derives from providing sustainable logistics.
- To identify the challenges that Transport Company X experiences in providing sustainable logistics.
- To determine how Transport Company X overcomes identified challenges.

1.8 THE SIGNIFICANCE OF THE STUDY

Studies on the benefits and challenges of sustainable logistics in the South African transport industry are limited. Therefore, it is envisaged that the findings and recommendations of this study will contribute to the existing body of knowledge by identifying areas through which sustainable logistics in the transport industry in South Africa can be improved.

1.9 RESEARCH METHODOLOGY

1.9.1 Research design

The study is exploratory and descriptive. Durrheim, TerreBlance and Painter (2006:47) indicate that "exploratory studies are used to make preliminary investigations into relatively unknown areas of research". This study is exploratory in the sense that it set out to discover the benefits it derives and the challenges Transport Company X experiences when providing sustainable logistics.

Using descriptive research helped the researcher to gather information and be able to describe the attributes of the research intent (Sekaran & Bougie, 2013:97). Descriptive data is data which is used to describe the concept. The aim was to provide an overview of the sustainable logistics at Transport Company X.

1.9.2 Research approach/ paradigm

The research method used in this study was that of qualitative research. QSR International (2014:paragraph 1) define qualitative research as "research about exploring issues, understanding phenomena, and answering questions by analysing and making sense of

unstructured data". This can be done via focus groups or in-depth interviews; as this research aimed at acquiring in-depth data.

In this study, data was gathered through face-to-face interviews with the relevant participants in the organisation. Six participants were interviewed from the company.

1.9.3 Study site

The study took place in the KwaZulu Natal (KZN) region. This study was conducted at 'Transport Company X' a pseudonym for a logistics company located in Pietermaritzburg. This company was selected because of its ease of accessibility. Furthermore, it is a sizeable company which has implemented sustainable logistics.

1.9.4 Sampling method

A non-probability convenient sampling technique was adopted to choose the participating company. Brus, Kempen and Heuvelink (2011:397) define non-probability sampling as a "sampling technique where the samples are gathered in a process that does not give all the individuals in the population equal chances of being selected". The participating company for this research was chosen because of its ease of accessibility hence the use on non-probability convenient sampling.

The type of non-probability sampling that was used in this study to choose the participants was that of purposive sampling. Purposive sampling, also referred to as judgemental, selective or subjective sampling is virtually synonymous with qualitative research. In this sampling the researcher selected a sample of experts and subjects according to the type of the topic and their skill concerning that topic (Palys, 2008:697).

1.9.5 Target population

McLeod (2014:paragraph 2) defines the target population as an entire group of people or objects that researchers want to draw and generalize their conclusions from. In this study the target population is the personnel in the different logistics departments at Transport Company X. The sample size included senior managers in these different departments. The sample size for this study comprised one senior manager in each department. This summed up the target population to six individuals – see Table 2.

Table 2: List of Participants

DEPARTMENT	PARTICIPANT	DATE	TIME
Operations	Participant A	24/07/2018	12:05
Warehouse	Participant B	25/07/2018	08:00
Operations	Participant C	25/07/2018	11:00
Transportation	Participant D	15/08/2018	11:00
Workshop	Participant E	16/08/2018	12:00
SHEQ, Legal and Wellness	Participant F	22/08/2018	12:00

1.9.6 Data collection methods

Primary data in this study was collected through the interviewing of six participants. Face to face, in-depth interviews were conducted, using a semi-structured interview guide. These participants were contacted two weeks prior to set an interview date.

In order to gain adequate data for this research, secondary data was collected as well. This was the review of academic journals, textbooks, dissertations, theses and articles. "Secondary sources like academic journals provide credible backup because they are peer reviewed, therefore there is an in-depth understanding of literature relating to the ground breaking aspects of the researcher's study" (Coldwell and Herbst, 2004:31).

1.9.6.1 Interview guide

An interview guide helps the researcher to reach the interview goals set. Unlike structured interviews, semi-structured interviews have a flexible and fluid structure which allows the interviewer to engage with the participant in a friendly manner, making the participant at ease (Rabionet, 2011:564). The semi-structured interview guide consisted of open-ended questions, as they are exploratory in nature. Powell and Guadagno (2008:383) point out those open-ended questions provide the researcher with rich qualitative data as the participant is not limited to a set of replies but can express him or herself when answering these questions.

1.9.6.2 Interviews

Interviews are research instruments that perform specific roles. They allow the researcher to gather diversified open-ended qualitative data. Interviews are a personal way of gathering information concerning a particular topic between the interviewer and the participant

(Rabionet, 2011:564; Rowley, 2012:261). The advantage of using interviews is that they enable participants to share their experiences of the topic at hand using their own words.

In order to realise the objectives of this study, semi-structured in-depth interviews were conducted.

1.9.7 Data analysis

The motivation behind analysing data is to obtain information that is practical and applicable. According to Mast and Kemper (2009:366) data analysis is "the art or science of examining raw data with the purpose of drawing conclusions about that information". The primary data was analysed using thematic data analysis. The raw data was categorised into themes, patterns, trends and relationships (Mouton, 2013:108).

1.9.8 Data quality control

According to Mast and Kemper (2009:369) data quality control is the credibility and trustworthiness of data efficiency. It refers to how the researcher measures what they are supposed to measure and that it measures in a consistent manner.

1.9.8.1 Credibility

Credibility concentrates on the actual research and refers to the confidence in how well the data collected addresses the desired focus (Polit & Beck, 2012:3). Thus the researcher should figure out the most suitable way to collect the data required for the study.

1.9.8.2 Trustworthiness

Trustworthiness is used to support the argument presented by the researcher that the findings are "worth paying attention to" (Elo *et al.*, 2014:2). There are four alternatives for assessing trustworthiness, which are **dependability**, **conformability**, **transferability** and **authenticity**. **Dependability** refers to unchanging data or information over a certain period of time and under different situations. **Conformability** refers to the likelihood for similarity between two or more independent people about the data's accuracy, relevance or meaning. **Transferability** refers to the understanding that findings can be generalised or transferred to other settings or groups. Lastly, **authenticity** refers to the extent to which researchers can fairly and faithfully show a range of realities (Polit & Beck, 2012:4).

In this study credibility was assured as the researcher reviewed the transcribed text data and analysis before it was written up. Dependability was assured by having an outside researcher

from the School of Humanities review the data collection, data analysis and the results of the study to confirm the accuracy of the study and to ensure the findings are supported by the data collected. Conformability was assured by means of triangulation, keeping a journal, documentation and interview recordings. With regard to transferability, Lincoln and Guba (1985:316) best describe it as "not the researcher's task to provide an index of transferability, however, it is his or her responsibility to provide the database that makes transferability judgments possible on the part of other researchers". Hence, in this study, transferability was assured by thick descriptions, which is a detailed account of the experiences of the researcher during data collection. Lastly, authenticity was assured by voice recording the interviews and appreciating each participant's viewpoint.

1.10 ETHICAL CONSIDERATIONS

The ethical clearance letter was issued by the ethics committee of the University of KwaZulu Natal before the primary data was collected (Appendix E). Each participant was given an informed consent form to sign prior to participating in this study. This form clearly stated that should the participant wish to withdraw from the study at any time, they could do so. Secondary data collected for this study was referenced accordingly using the Harvard Referencing System as required by the University. Confidentiality and anonymity was maintained throughout the study.

1.11 DEMARCATION OF THE STUDY

This study was limited to the sustainable logistics at a South African logistics company, Transport Company X. The information obtained in this study outlines the factors affecting Transport Company X, and cannot be generalised for every other logistics company.

Furthermore, this study focused on the employees at Transport Company X. The participants involved in the study were from different logistics departments within the company, not necessarily covering all departments within the company.

The interview guide drawn up highlighted the motivation behind providing sustainable logistics, the benefits obtained from providing sustainable logistics, the challenges

experienced in providing sustainable logistics and lastly the way the company overcomes the afore mentioned challenges.

1.12 STRUCTURE OF THE DISSERTATION

Chapter 1	**Introduction and Background** This chapter introduces and outlines the study. The chapter deals with the background of the study, definitions of terms and concepts, research problem/statement of the problem, theoretical framework, research questions, research objectives, the significance of the study, research methodology, ethical considerations, limitations of the study and the structure of the dissertation.
Chapter 2	**Theoretical Review of Sustainable Logistics** This chapter focuses on reviewing existing literature to explain fully logistics, sustainability, dimensions of sustainability and sustainable logistics in relation to the study. The theoretical framework is also outlined in this chapter.
Chapter 3	**Motivation, Benefits and Challenges** This chapter deals with the various reasons behind providing sustainable logistics, the benefits and challenges experienced in providing sustainable logistics. It also outlines possible solutions to the identified challenges.
Chapter 4	**Research Methodology** This chapter focuses on the research methodology used in order to achieve the objectives that were set out for this study. The chapter included research design, research approach/paradigm, study site, sampling design, target population, data collection methods, data analysis, data quality control, ethical considerations and limitations of the study.
Chapter 5	**Analysis, presentation and discussion of the findings** This chapter focuses on analysing and the presentation of the data that was collected from participants. The data is interpreted, discussed and conclusions are drawn out in relation to the research objectives of the study.
Chapter 6	**Recommendations and suggestions for future research** This chapter provides the summary of the study and outlines the main findings with regards to the research objectives of the study. The chapter closes with suggested recommendations for future research.

1.13 SUMMARY

This chapter highlighted the introduction and outline of the research study. The background to the study was highlighted, and different terms and definitions used in the study were explained. The theoretical framework underpinning this study was highlighted. A problem statement and research questions were formulated. The research objectives were derived from the research questions.

The company chosen for this study, Transport Company X, was selected because of its importance in the logistics industry. The study was narrowed down to focus mainly on motivation behind providing sustainable logistics, benefits of providing sustainable logistics, challenges experienced in providing sustainable logistics and lastly the possible solutions to the identified challenges. In order to achieve the aim of this study, the research methodology was briefly explained. An overview of the research design was presented, together with the significance of the study, ethical considerations, and limitations of the study and lastly the structure of the dissertation.

The next chapter, Chapter 2, presents a theoretical review of sustainable logistics.

CHAPTER 2

THEORETICAL REVIEW OF SUSTAINABLE LOGISTICS

2.1 INTRODUCTION

Chapter one focused on the introduction and background of the study. This chapter reviews the appropriate literature. The goal is to provide insight into sustainable logistics practices of transport companies and how they overcome the challenges they face in providing these practices.

Mangan and Lalwani (2016:4) state that logistics and supply chain management (SCM) are interesting areas that have an impact on the lives of different individuals, for example, consumers and the different products that they purchase and consume each day – how do these products reach the customer and at what cost?

The next section looks at various definitions and the meaning of logistics in the supply chain context.

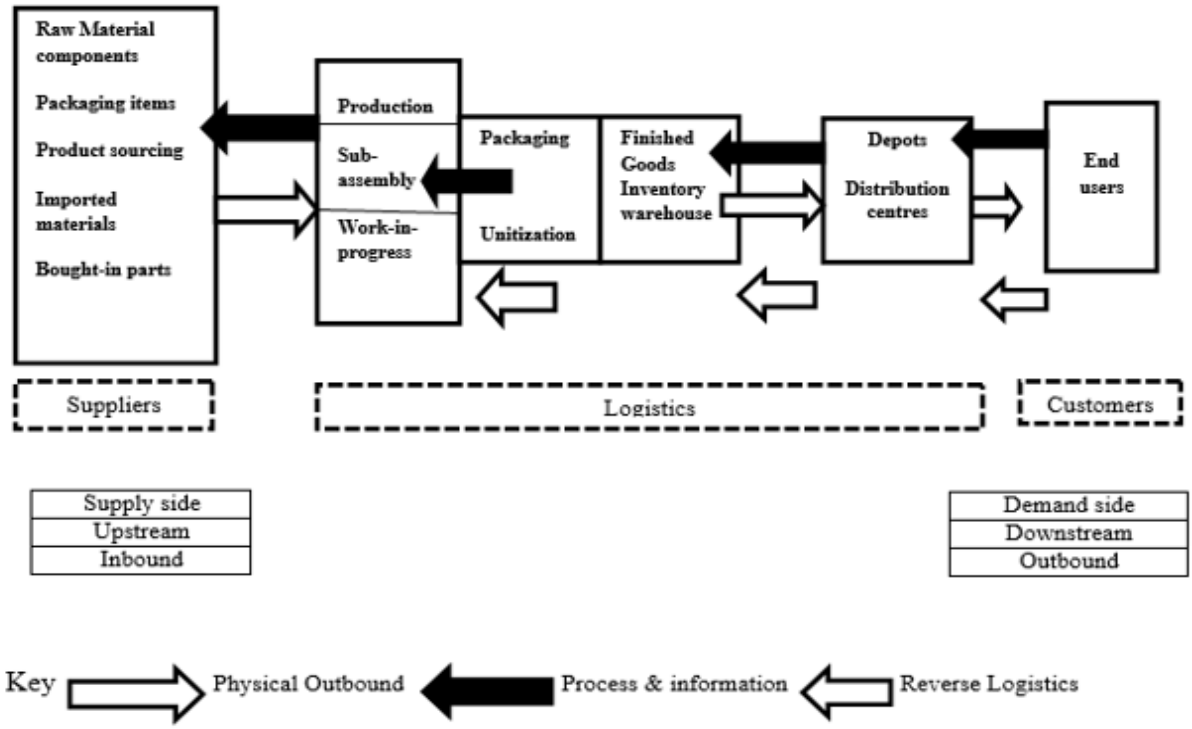
2.2 LOGISTICS

Christopher (2016:5) defines logistics as "the process of tactically managing the procurement, transportation and storage of materials, parts and finished inventory, including related information flows through the organisation and its marketing channels in such a way that current and future profitability are maximised through the cost-effective fulfilment of orders". In addition, logistics management is serving customers in the most cost-effective way. Mangan and Lalwani (2016:9) define logistics as the "process of planning, implementing and controlling systems for the effective and efficient transportation and storage of goods including services, from the point of origin to the point of consumption for the purpose of observing customer requirements". Mangan and Lalwani (2016:9) further depict that logistics involves "getting the right product, in the right way, in the right quantity and right quality, in the right place at the right time, for the right customer at the right cost".

Rushton *et al.* (2014:4) define logistics as a "part of supply chain management that plans, implements, and controls the efficient and effective forward and reverse flow and storage of finished products, services and any other related information between the point of origin and

the point of consumption in order to meet the customer's requirements". It is important to note that logistics is not only concerned with the distribution of physical products but also with information flows and storage and also reverse logistics. Figure 2 depicts all these different elements and flows, as well pointing out how logistics terms can be applied.

Figure 2: Represents the logistics of a FMCG manufacturer



Source: Rushton, Croucher and Baker, (2017:5)

2.2.1 Physical outbound flow

The physical outbound flow has a major impact on the supplier's customer relations management (CRM) process. Liberatore and Miller (2016:1) define the physical outbound flow as the "process related to the movement and storage of goods or products from the end of the manufacturing line to the end user". Most retailers demand that their suppliers adhere to strict product delivery standards. Failure to meet these standards can result in significant financial costs or the retailer removing the supplier's products completely its product portfolio. Thus, performance of outbound logistics highlights to the retailer on whether or not to keep a supplier's products. It is also important to note that the physical outbound flow includes the "last mile" which is the final step in the delivery process, which is one of the elements that can make or break the CRM process (Stapleton *et al.,* 2012:899).

2.2.2 Process and information flow

The main material flow is forward from suppliers, to manufactures to distributors to retailers and to the end consumer. Reyes *et al.* (2012:178) state that efficient and smooth process flows can only be realised when problematic and delayed lead times are resolved. This can be achieved using the application of lean principles and reduction of inventories.

Information exchange is important as it is the extent to which data is interchanged between processes. Information sharing leads to better reverse logistics performance (Sandberg, 2007:277). Grunt and Nowakowska (2010:74) point out that effective logistics management is achieved from information flow that occurs smoothly and quickly, so as to provide managers with the required information for effective decision making.

2.2.3 Reverse logistics flow

Olorunniwo and Li (2010:454) observe that returning of material that can be recycled or disposed of in a specific manner from customers back to the organisation is also important in supply chain management (SCM), owing to product returns and green sustainability issues. Reverse Logistics is a wide term that is used in logistics management and refers to the disposing of harmful or non-harmful waste, from recyclable materials or products to non-recyclable. It involves reverse distribution, the transformation of goods or information in the opposite direction as opposed to that of normal logistics activities (Dekker *et al.*, 2013:5).

2.3 SUSTAINABILITY

2.3.1 What is sustainability

The World Commission on Environment and Development (1987:16) came up with the definition of sustainability after reviewing the problem faced by the environment and development. The theory behind sustainability was first brought up in forestry, where it meant "never harvesting more than what the forest can yield" (Kuhlman & Farrington, 2012:3437). Sustainability is later defined by Morelli (2012:2) as the "development that meets the needs of the present without compromising the ability of future generations to meet their own needs". Ehrenfeld (2005:23) defines sustainability as the possibility that all forms of life will flourish forever. White (2013:214) on the other hand defines sustainability as the "means of transforming our ways of living to maximise the chances that environmental and social

conditions will indefinitely support human security, well-being and health". Therefore, this means that sustainability ensures a healthy community or generation in the future.

An assumption is made in previous studies that a lack of sustainability practises is due to a lack of knowing fully the benefits derived from it (Hereen *et al.,* 2016:614). Roberston, (2014:13) clearly mentions that extensive and comprehensive knowledge is required to grasp and to understand the relationship between social, economic and environmental systems that sustainability entails. Sustainability studies have been merging and increasing since the 1990s. Research shows that sustainability is widespread over different disciplines, across natural and social sciences (Bettencourt & Kaur, 2011:19542).

2.3.2 Importance of sustainability

There are four main reasons why sustainability is important and requires urgent attention. Epstein and Buhovac (2014:4) mention these reasons and their importance. These are **regulations**, **community relations**, **cost and revenue imperatives** and **societal and moral obligations**. These are explained as follows:

- **Regulations:** These are governmental codes of conduct that require businesses to operate in a sustainable manner. Failure to adhere to these regulations will result in companies facing certain penalties and fines (Epstein & Buhovac, 2014:4). Government promotes sustainable practices due to the good returns it provides. Sustainable practices preserve the natural resources that are already scarce and reduce environmental costs (Global Affairs Canada, 2014:para. 4).

- **Community relations:** The general public and other non-government organisations (NGOs) are all enhancing sustainability and its importance to the economy, environment and society (Epstein & Buhovac, 2014:4). There are different resources that can help gather information on sustainability and in turn help communities reduce their use of natural resources and be productive (EY & Boston College, 2013:3).

- **Cost and revenue imperatives:** Epstein and Buhovac (2014:5) posit that being sustainable is a cost saving factor for organisations and may improve their reputation. This can be attributed to the reduction of improper use of resources, product and process improvements and the avoidance of regulatory fines or penalties. Increases in sales will be also experienced because of the sustainable reputation. A number of organisations globally have achieved cost savings by applying sustainable practices in their day to day

businesses. Examples include: a reduction of energy usage, reduction of carbon emissions that results in reduced carbon taxes, and improvement of water management systems (Bancilhon, 2011:5).

- **Societal and moral obligations:** Most organisations are personally responsible for the impact they have on the economy, environment and society, hence have chosen to include sustainability in their strategies. That is, an organisation will seek to operate in a sustainable manner from the root of its production, instead of trying to manipulate the end product or service to be sustainable (Epstein and Buhovac, 2014:5).

2.4 DIMENSIONS OF SUSTAINABILITY

Sustainability has three dimensions that it strives to integrate (Theis, 2012:1). These are economic, environmental and social sustainability. Kuhlman and Farrington (2010:3438) acknowledge that "economic development, social development and environmental protection are interdependent and mutually underlining components of sustainable development". Economic, social and environmental factors focus on profit, people and the planet. The 'profit' which emanates from the money generated through gross domestic products (GDP) helps to finance the care of the environment, which is the 'planet' and also provides funds for the handicapped and financially challenged individuals, the 'people'.

Economic interests look at the financial aspects of the economy, also the facilitation of commerce, skills and knowledge. Environmental aspects recognize the interdependence within living systems and the impacts of human waste. Lastly the social aspects refer to interaction between firms and people, well-being, ethical issues and decision making that depends upon collective action (Theis, 2012:2). These three aspects of sustainability have a goal of being multidimensional, raising the issue of how to balance objectives and how to judge success or failure in overall sustainability (Harris, 2003:1).

Werbach (2013:10) points out that social aspects focus on all surroundings that affect all members of a society. These can be public health, violence, and or poverty. Economic aspects on the other hand focus on activities that are concerned with how people and organisations meet their financial or cost effective needs, for example, shelter, securing food, water and other needs. Lastly environmental aspects focus on anything that affects the earth's ecology,

which is climate changes, greenhouse emissions and anything that can potentially harm the environment.

Azapagic and Perdan (2014:130) also point out different sustainability issues identified by stakeholders. Regarding economic sustainability, a few issues are pointed out, such as cost variability, operability, and cost of generation. Environmental sustainability points out a few issues of concern. Global warming, climate changes, recyclability, gas emissions, water eco-toxicity and land use and quality are among the many issues of the environment. Lastly social issues that are mentioned include reduction of unemployment, improvement of living standards, health impacts, energy security and nuclear growth.

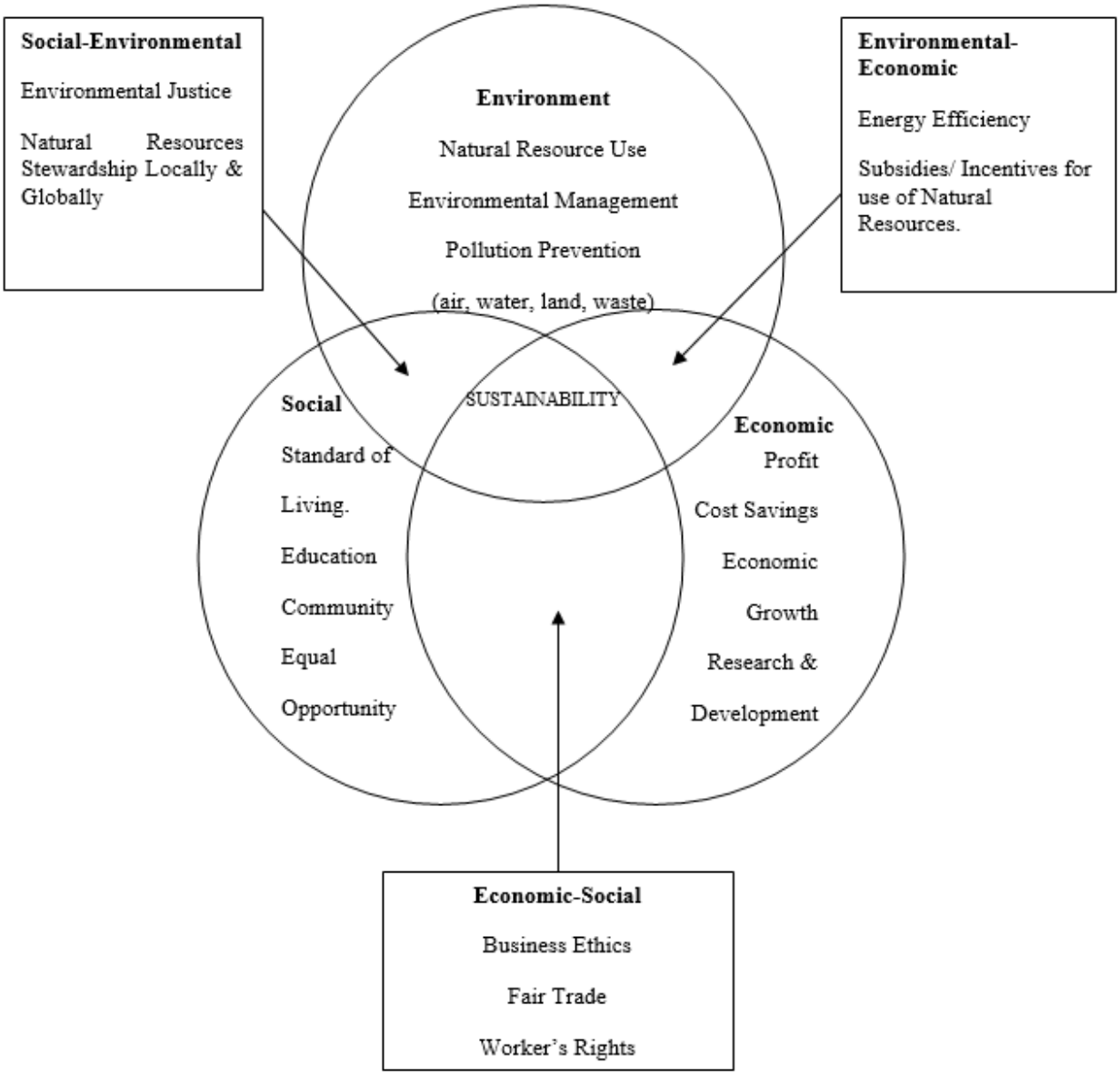
Figure 3 illustrates the three spheres of sustainability and as Rodrigues *et al.,* (2002:17) observe if any of the spheres is weak then the entire system as a whole is not sustainable.

2.4.1 Environmental sustainability

Morelli (2011:5) defines environmental sustainability as "meeting human needs without compromising the health of ecosystems". He further defines environmental sustainability as a state of balance, flexibility and interconnectedness that allows the human race to satisfy its current needs without exceeding the capacity neither of its non-renewable ecosystems so as to continue satisfying the services necessary to meet those needs nor by our actions diminishing biological diversity. According to Moldan *et al.,* (2012:6) environmental sustainability "seeks to improve human welfare by protecting the sources of raw materials used for human needs and ensuring that the sinks for human waste are not exceeded, in order to prevent harm to humans". Environmental sustainability has been of major concern in recent years. Managers and researchers are committing more of their attention to facing the challenges of attaining a balance between environmental and organisational needs (Caniato *et al.*, 2012:659).

Environmental issues are of major concern to organisations that have notable environmental impacts and high apparentness in the public eye. Melville (2010:4) mentions that environmental sustainability is very clear in scope, complexity and urgency. Environmental sustainability includes the natural environment, for example, land, water, air and so on. Therefore, organisations that directly harm the environment in those different aspects ought to operate in a sustainable manner to avoid public condemnation.

Figure 3: Three spheres of sustainability



Source: Rodriguez, Roman, Sturhahn and Terry, (2002: 16)

To achieve environmental sustainability Shi *et al.,* (2012:57) note that it is vital to implement it at the product design stage. Product design is defined as a product's characteristics, such as its appearance, the raw materials it is made of, it dimensions and tolerances and its performance standards (Hill, 2010:43). However, environmental sustainability is a process that should be considered at all stages of the product. This will result in products that will reduce the impact of harm to the environmental and protect the environment throughout its life-cycle. Zhu *et al.,* (2008:6) point out the main areas of focus when it comes to ensuring that a product or service will achieve environmental sustainability. These areas are "recovery

and reuse, disassembly, recyclability, waste minimisation, material conservation, accident prevention, reduced consumption of material/energy, to avoid or reduce use of hazardous products and manufacturing processes, remanufacturing and lastly disposal".

Moldan *et al.*, (2012:6) list different criteria for environmental sustainability. These include: **regeneration**, which means that renewable sources will be used effectively and efficiently and their use should not exceed the amount of time it takes for those sources to regenerate. Secondly, **substitutability** focuses on non-renewable resources, and how they should be used effectively and efficiently. Their use should be determined by how they can be substituted for using renewable sources or any other forms of sources that equally serve the same purpose. **Assimilation** focuses on the release of hazardous, polluting or harmful substances to the environment; these carbon emissions should not exceed their assimilative capacity. The last criterion, **irreversibility**, deals with how some resources cannot be reversed or recycled, and hence they should be used effectively and efficiently as well.

Sustainability has become of utmost importance to most organisations and industries. Intelligence influences environmental sustainability in organisations (Salahodjaev, 2015:33). This is because organisations today have taken it upon themselves to learn all they need to learn about implementing processes that preserve the environment in order to stay competitive and profitable. Organisations and the government are turning their focus to the question of "*how we can make the world a better place?*" (Malhotra *et al.*, 2013:1265). It is important for organisations and the government to adapt to environmental sustainability practices and introduce mitigation action in order to decrease current greenhouse gas emissions, prevent further degradation and to prevent further increases to these emissions that impact the ecosystem in a negative manner (Ralph and Stubbs, 2014:72). Furthermore, it is important for organisations to introduce practices that minimise energy usage, water consumption and pollution. This can be done through the introduction of innovative efforts such as reduce, renew, rethink and recycle (Eltayeb *et al.*, 2011:9).

2.4.2 Economic sustainability

Doane and MacGillivray (2010:17) define economic sustainability as "the degree to which a company actively and constructively uses its resources to support the social and economic developments of communities, through direct investments of cash, in-kind support or staff time, or through organisational policies that generate community capital, such as local sourcing, hiring, partnerships and education". Harris (2003:1) mentions that an economically

sustainable system must be able to "produce goods and services on an ongoing basis, to maintain manageable levels of government and external debt, and to be able to avoid extreme sectorial imbalances which damage agricultural and/or industrial production". Goodland (2002:2) on the other hand defines economic sustainability as maintaining capital or keeping capital intact.

Economic sustainability is important as it covers certain economic objectives. The objectives covered include: "profits, market share, revenues, and customer value and customer satisfaction" (Belz and Peattie, 2012:129). In simpler terms, economic sustainability revolves around the sustainability of an organisation's financial aspects. Economic sustainability should also be able to cover the costs incurred in achieving social and environmental sustainability. Economic sustainability can help organisations to be innovative, force the organisation to come up with new ways of production, make new relationships with stakeholders.

Sustainability is important in the sense that consumers value it and are prepared to pay high prices for products or services that are sustainable. Changing resources/raw materials or how the products are made or manufactured can also result in reduced costs (Bergqvist & Lindgren, 2014:24). When an organisation is perceived as the sustainable leader of the industry, customers are likely to spend more money and time on that organisation (Bergqvist & Lindgren, 2012:24).

2.4.3 Social sustainability

Social sustainability has been perceived in the past by Gilbert (1996:1740) as sustainability that "requires the cohesion of society and its ability to work towards common goals to be maintained. Individual needs, such as those of health, well-being, nutrition, shelter, education and cultural expression should be met". Moldan, Janouskova and Hak, (2012:5) define social sustainability as "the extent to which social values, social identities, social relationships and social institutes can continue into the future". Torjman (2000:7) characterises social sustainability from a social perspective, pointing out that human beings will not find satisfaction or sustainability without a healthy environment and also are unlikely to be happy in the absence of a vibrant economy.

In the past social sustainability was regarded as minor as when compared to economic and environmental sustainability. However today, it has become mandatory in most organisations. This is done to ensure that not only organisations are protected but also the human side from a

health and safety perspective (Huq, Stevenson and Zorzini, 2014:611). Watkins (2013:48) points out that social sustainability aims at understanding the concern of how society interacts with nature as well as some of the internal challenges such as social justice, gender and political participation.

2.5 SUSTAINABLE LOGISTICS

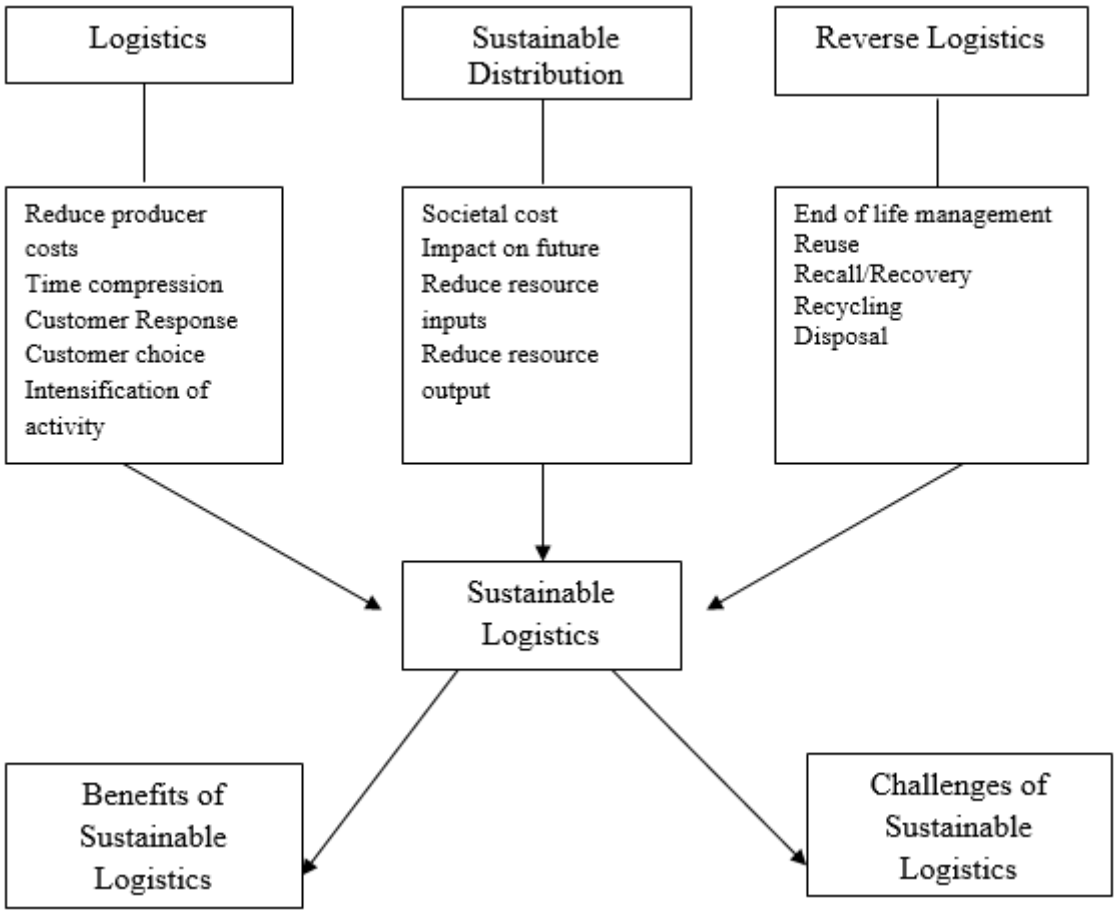
2.5.1 What is sustainable logistics

In the beginning sustainable logistics was defined as that "which does not endanger public health or ecosystems and that which meets needs for access consistent with (a) use of renewable resources that are below their rates of regeneration, and (b) use of non-renewable resources that are below their rates of development of renewable substitutes" (OECD, 2001:18). Sustainable logistics is also a system in which fuel consumption, vehicle emissions, safety, congestion, and social and economic activities are of such levels that can be accessed and sustained into the indefinite future. Penny (2009:5) points out that sustainable logistics explicitly manages the environment and social impacts, that is, the efficient and effective movement and storage of goods between the points of origin and destination or back again.

Creating sustainable development and corporate social responsibility, while creating a marketing strategy, is to create recognition of not only the needs of the organisation but also those of the society that operates in the same environment (Dima, Grabara & Modrak, 2014:148). Sustainability plays a role in preserving available resources for future generations. Logistics activities have an impact on the environment through various carbon emissions; hence sustainability is a matter that should be considered (Large, Kramer & Hartmann, 2012:3). These activities are mainly purchasing, warehousing and transportation.

Figure 4 depicts an illustration of the strands of sustainable logistics. These strands are used as the theoretical framework for this study, since it is important to identify the different components of sustainable logistics and the outcomes.

Figure 4: Strands of sustainable logistics



Source: Rodique, Comtois and Slack (2009:7)

2.5.2 Areas of sustainable logistics

Cilibert, Pontrandolfo and Scozzi (2008:90) created a classification for logistics corporate social responsibility practices. These are put in place to help enable organisations to practice sustainable logistics. Ciliberti *et al.* (2008:91) point out five areas that result in sustainable logistics if implemented. These are, "Purchasing Social Responsibility; Sustainable Transportation; Sustainable Packaging; Sustainable Warehousing and Reverse Logistics" (Ciliberti *et al.* 2008:91). These will be briefly outlined as follows:

2.5.2.1 Purchasing social responsibility

This can be interpreted as "socially responsible supply management activities" (Carter 2005:177). This is generally the consideration of the purchasing decisions that can have an impact on social issues promoted by the organisation. Haghandish and Ingelgard (2006:11) define purchasing social responsibility as a section of corporate social responsibility and thus

deal with the organisation's supply chain system. Most well-known brands are conscious about comments made regarding the social impact of the supply and production of their products. Organisations are aware of the bad publicity that can ruin their business if the society does not approve of their processes. Therefore, purchasing social responsibility is used to lower these risks and also to uncover new sustainable innovations to keep companies competitive.

2.5.2.2 Sustainable transportation

Haghshenas and Vaziri (2012:115) have three definitions of sustainable transportation. Firstly, it is transportation that allows fundamental desires of people and those of society to be met without compromising any human and ecosystem health and also considering fairness within and between generations. Secondly it is defined as transportation that is cost-effective, well organised, offers choice of transportation mode and supports economic growth. Lastly sustainable transportation encourages a lean system of operation, which limits emissions, harmful waste to the environment, reduces the use on non-renewable resources, also limiting the use of those renewable resources, encourages recycling, reuse and minimizes noise pollution.

2.5.2.3 Sustainable packaging

Sustainable packaging has been defined earlier as "packaging that is valuable to society and the environment by ensuring that it protects products during movement or transportation across the supply chain and is designed to use materials that are renewable or recyclable and are also energy efficient. The products used must not cause a threat to human life and to ecosystems, whether be it in use or at the disposal stage" (James *et al*, 2005:21). Pires *et al.*, (2015:343) mention that all aspects involved in the packaging industry life cycle, should carry the responsibility of reducing pollution that comes from packaging waste.

2.5.2.4 Sustainable warehousing

Sustainable Warehousing (or storage) has received less attention from researchers as compared to transportation. Most sustainability issues focus on transportation or manufacturing aspects of the supply chain and not much on the warehouse. Warehouses are incorporated with commercial buildings, which on a global scale are said to emit approximately 5.25 percent of gas emissions, 65 percent of those resulting from energy usage, such as electricity (Rudiger, Schon & Dobers, 2016:890). Sustainable warehousing has eight

major constructs which has various components that show how a sustainable warehouse can be achieved. These constructs are illustrated in Figure 5.

Figure 5: Eight constructs of sustainable warehousing

Source: Amjed and Harrison, (2013:5)

These eight construct, have various components that are explained briefly.

a. Warehouse facility design

Gong *et al.* (2013:560) point out that warehouse facility design is a calculated decision, once the design has been laid out, it becomes demanding for it to adapt to changing environments. Hence this means the design should incorporate sustainable practices from the beginning, so that it can adapt to environmental changes. Saunders (2010:26) mentions that developing a sustainable warehouse facility design can be introduced when building a new structure or when renovating an already existing structure. An example is that of Imperial Logistics. Imperial's new expansion considers the environment. The design is defined by "Green" thinking. The company aims at having less energy consumption and water saving initiatives and these include: "(1) Motion sensing and low wattage lighting, (2) Solar panels and solar powered equipment, (3) Storm water or grey water harvesting, (4) Water recycling system to be employed" (Imperial Logistics, 2016:para.5).

b. Warehouse layout

Kaizen Institute (2017:para. 1) points out that it is vital to use the five S's to manage and organise a work environment. These are (1) **Sort,** meaning separating what is needed and what is not needed in the area. (2) **Straighten,** arranging all needed and essential items in a way that they are ready and easy to use. Clearly label out locations for each item in the warehouse, so that they can easily be identified and returned to specific location after use. (3) **Shine,** warehouse equipment to be cleaned and maintained regularly so as to identify any defects. (4) **Standardise,** revisit the first three of the 5s regularly for maintenance purposes and continuous improvement within the warehouse. (5) **Sustain,** maintain all the 5s and keep improving where required. Thus the warehouse layout, type of storage systems, isles, and division of space, partitions and zones determine the effective and flexibility of warehouse operations (De Koster, Le-Duc & Roodbergen, 2012:482).

c. Inventory management

Inventory management allows holding of limited stock that can meet changing customer demands. This results in improved warehouse utilisation; reduced utility, labour and capital costs. Huge financial costs are tied with holding inventory. These are insurance, maintenance, transport and any defect costs (Michalski, 2010:83).

d. Warehouse staff

This construct focuses on training staff, ensuring a balance between work and life, motivating staff, shift management, and health and safety. Productivity in the warehouse only occurs when staff is happy and motivated. Employees that are dissatisfied or not qualified will jeopardise the flow in the warehouse. Customer service levels will decrease; poor management of inventory stock will be experienced resulting in an increase in unnecessary costs (Mohan, 2014:5).

e. Mechanical handling equipment

Different types of warehouse mechanical or material equipment are used in the warehouse for movement of goods in and around the warehouse. Soputro and Rouyendegh (2016:35) point out that this equipment is usually used for loading, offloading, moving and lifting of products within the warehouse. Specialised electrical movement, such as conveyers and robots can be used in warehouses; however, the focus in this construct is on manually controlled equipment such as forklifts (Vigithra *et al.*, 2016:125).

f. Warehouse operations

Warehouse operations refer to all activities that are carried out in warehouses on a daily basis. These include physical activities like, unloading, loading, pallet relocation, receiving, put-away, storage, inventory counting, materials handling, retrieval, case picking and so on. All these activities need to be carried out in an efficient and effective manner in order to achieve optimum results that will lead to improved productivity and sustainable logistics (Lu *et al.*, 2016:109).

g. Onsite facilities

Various facilities must be available onsite so as to support employees with certain emergencies such as medical emergencies. Cross-docking can be added, although it is not compulsory for it to be on site. This adds to the sustainable achievement by reducing costs which impacts the economic factor of sustainability (Murray, 2016:para. 4). This also improves efficiency and effectiveness in the warehouse, as space is reserved and clutter is avoided and also time is not wasted in packing away products and picking them when required. Murray (2016:para. 3) also emphasises the importance for warehouses to have onsite recycling as this will help enhance the achievement of sustainability within the warehouse and entire logistics.

h. Warehouse management system

A Warehouse Management System (WMS) is intensely important and required to be able to manage a world-class green sustainable warehouse. This system deals with all the movement and storage of goods in the warehouse. It "controls all the transactions for receiving, shipping, stocking and picking" (Guo, 2014:1795). Palevich (2011:27) states that the WMS does not only control the internal activities of the warehouse, but also manages the entire warehouse facility. Therefore, it plays a fundamental role in ensuring sustainable social and green environment performance of the facility.

Therefore, the above provided insight into the elements of achieving a sustainable warehouse that is required to achieve sustainable logistics throughout the entire organisation.

2.5.2.5 Reverse logistics

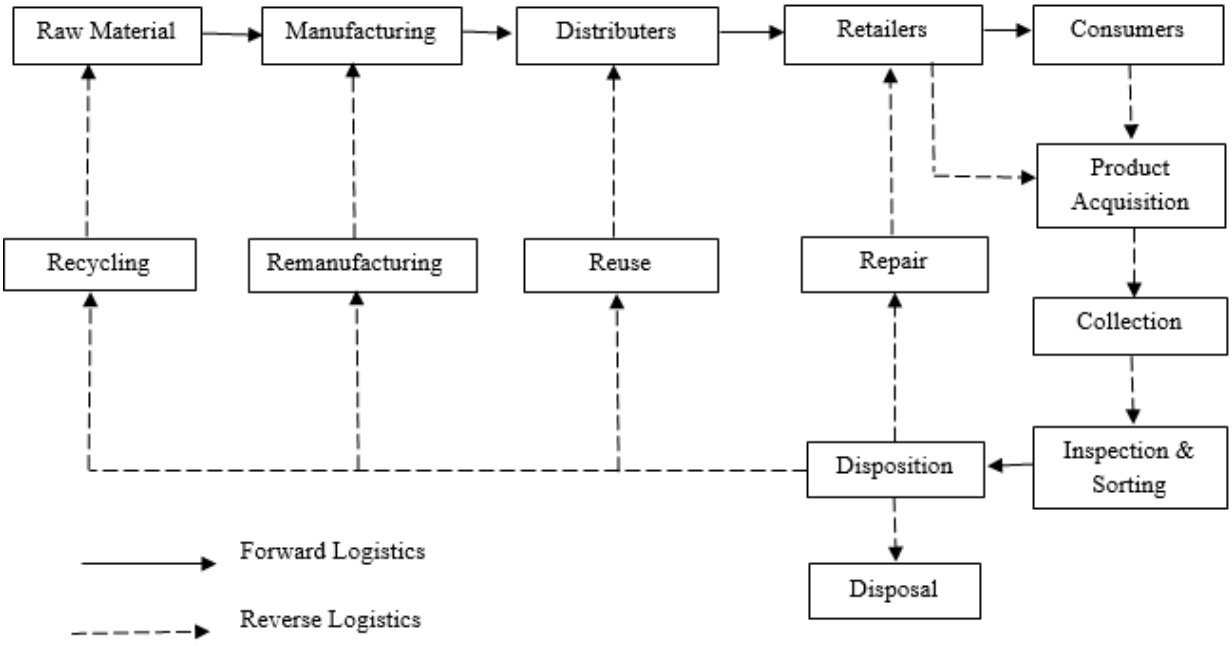
Grant, Trautrims & Wong (2013:18) are of the opinion that for an organisation to succeed in sustainability it has to practise reverse logistics. This concept has been practised by logistics

organisations for decades and it is further defined by Grant *et al.* (2013:19) as the "process of planning, implementing and controlling the efficient, cost-effective flow of raw materials, in-process inventory, finished goods and related information from the point of consumption to the point of origin for the purpose of recapturing value or proper disposal".

Reverse Logistics is a term that is used in logistics management and refers to the disposing of harmful and non-harmful waste, from recyclable to non-recyclable materials or products. It involves reverse distribution, the transformation of goods or information in the opposite direction as opposed to that of normal logistics activities (Dekker *et al.,* 2013:5). It is vital to note that reverse logistics is not the same as waste management. The latter usually refers to the disposal of materials or products that cannot be recycled or recovered to be re-manufactured or made to something that can add value (Dekker *et al.,* 2013:6). Abdulrahman, Gunasekaran and Subramanian (2014:461) point out that reverse logistics on the other hand deals with the reversing of materials or products that can be recycled or recovered. These products have the capability of adding value to the supply chain of an organisation. Reverse logistics is also different from green logistics as green logistics focuses on environmental aspects in all logistics activities and has been used to concentrate specifically on forward logistics, i.e. producer to customer (Kherbash & Mocan, 2015:44). Reverse logistics however, resembles sustainable development, which is making sure present needs are met without compromising future needs.

Figure 6 illustrates the different basic flows of forwards and reverse logistics processes. Products set apart for returns are collected after their purchase and are inspected and sorted into different categories, whether recyclable or non-recyclable. The following step is to dispose of them accordingly, whether for repair, remanufacturing, recycling, reuse or final disposal depending on whether the product can still recapture value or not (Agrawal, Singh & Murtaza, 2015:78). The key processes briefly described are product acquisition; collection; inspection/sorting and disposition.

Figure 6: Basic flow of forward and reverse logistics processes



Adapted from: Agrawal, Singh and Murtaza, 2015:78

- **Product acquisition/gate keeping**

This is acquiring used products or materials from end users for further processing. Guide and Wassenhove (2003:22) mention in the past that "product acquisition is the first step and is vital for establishing successful reverse logistics". Gate keeping is the act of decision making, to decide whether a product returned by the end consumer should be accepted and taken for processing or should be given back to the end consumer (Agrawal *et al.*, 2015:78).

- **Collection**

After purchasing products, materials or components from end user consumers, products are collected to be processed for inspection, sorting and disposition. Kumar and Putnam (2015:307) mention three collection methods which show that (1) manufacturers can collect directly from customers, (2) manufacturers can collect via retailers and lastly (3) manufacturers can collect through third-party logistics. The decision of where to locate collection centres should be chosen wisely so as to design an effective and efficient Reverse Logistics process (Pochampally & Gupta, 2014:250).

- **Inspection and sorting**

Product, material or component returns may be “commercial returns, service returns, distribution returns or end of life returns” (De Brito & Dekker, 2012:2009). Customers return products for known or unknown reasons and the state of the returned products differs greatly. Therefore, there is a need for separate inspection and sorting out of the products (De Brito & Dekker, 2012:2009). Loomba and Nikashima (2012:210) examine the role of sorting out the end products before disassembling them, determining whether the products can be repairable and if they are recyclable. Also there is consideration of environmental factors, such as pollution and if the end waste is not harmful to the environment.

- **Disposition**

Thierry *et al.* (2014:115) point out three disposition methods as “product reuse, product recovery and waste management”. There are various different scenarios that can be used for disposition alternatives. Five normally used disposition alternatives discussed previously by Mutha and Pokharel (2009:336) are reuse, repair, remanufacturing, recycling and disposal.

2.6 SUMMARY

The following sections were covered in this chapter: logistics, sustainability, dimensions of sustainability, sustainable logistics, the different strands of sustainable logistics and their outcomes. The theoretical framework of the study is important, as the interview guide is based on this framework.

The literature review focused on collecting data from secondary sources. This was the review of academic journals, textbooks, dissertations, thesis and articles from reputable and research institutes, reports from various companies and websites.

The next chapter (Chapter 3) gives insight into the motivation as to why logistics organisations provide sustainable logistics, the benefits obtained from providing sustainable logistics, the challenges experienced from providing sustainable logistics and how organisations resolve these challenges.

CHAPTER 3

SUSTAINABLE LOGISTICS: MOTIVATION, BENEFITS AND CHALLENGES

3.1 INTRODUCTION

This chapter reviews the relevant literature, to provide insight into the motivation as to why organisations provide sustainable logistics, the benefits of providing sustainable logistics, challenges experienced in providing sustainable logistics and the potential solutions to the challenges incurred.

3.2 MOTIVATION WHY ORGANISATIONS PROVIDE SUSTAINABLE LOGISTICS

Logistics activities, specifically transportation, can have a negative impact on the environment. This impact can be through air pollution, noise pollution and safety of people, such as road accidents (Rossi *et al.*, 2013:590). When it comes to environmental sustainability, logistics is said to be one of the most polluting services compared to the other services. Consequently, sustainable logistics is a requirement in order to keep the environment friendly for future generations (Fernie and Sparks, 2014:3). Transport has been highlighted as a major contributor to world global emissions, in the logistics context (Azlina, Law & Mustapha, 2014:601; World Economic Forum, 2017:para.3).

In Europe, 2009, 30% of emissions were a result of logistics, in particular transport, and since then there seems to have been an increase in the emissions resulting from transport activities (European Commission, 2016:para. 5). However, from a social sustainability point of view, the logistics sector is employment concentrated. As a result, unemployment is reduced by most logistics companies (Schnittfeld & Busch, 2015:340).

Halldorsson and Kovacs (2010:7) point out vital reasons for establishing sustainability in firms or logistics organisation, and these are – “desire to do the right thing, pressure from customers, desire to attract green customers and competitive pressures”. Dey, LaGuardia and Srinivasan (2011:1240) mention four reasons why it is important for a company to provide or

invest in sustainable logistics. These are the "value of the brand, the misuse of resources, government intervention and international standards and regulations" (Dey, LaGuardia and Srinivasan, 2011:1240). These will be briefly explained:

3.2.1 Desire to do the right thing

The desire "to do the right thing" refers to an organisation's wish to position itself and be regarded as a responsible organisation in the industry (Lieb & Lieb, 2013:525). Pullman, Maloni and Carter (2009:40) reveal that organisations carry out sustainable supply chains to improve a company's competitive advantage and also performance. Potential risk or business loss that results from unethical supply chains also motivates most logistics organisations to "do the right thing" by complying with the sustainable supply chain practices (Hofmann *et al.*, 2014:165).

3.2.2 Pressure from customers

Customers are said to be one of the most influential stakeholders of any organisation as they can positively or negatively affect the organisation by closely associating with it or boycotting by not purchasing any services or products from the organisation (Collins, Steg & Koning, 2010:560). Furthermore, public opinions and pressures are another motivator for logistics organisations to carry out sustainable supply chains (Sharfman, Shaft & Anex, 2009:5). For example, allegations were brought against Tiger Brands Enterprise. The, organisation was blamed for distributing infected processed meat products with the listeriosis monocytogenes strain ST 6, which killed about 27% of patients that were infected with the strain in South Africa. Customers have since distanced themselves from the processed meat products from Tiger Brands Enterprise (The Rep, 2018:paragraph 3).

3.2.3 Desire to attract green customers

Due to the growing concern of environmental conditions, consumers are making sensitive decisions when it comes to their purchases, as they desire to associate themselves with organisations that are environmentally friendly (Sarigollu, 2009:366). Ali *et al.* (2011:218) state that environmental concerns influence consumer demands and behaviours. Organisations aspire to attract green customers, as these customers are likely to show added interest for environmentally friendly services or products, and are keen to purchase or pay more for these products/services (Manaktola & Jauhari, 2011:366). As people gain awareness of the impact

the products they purchase have on the environment, their attitudes and purchasing behaviour also are inclined to change.

3.2.4 Competitive pressures

Organisations are always looking at maintaining their competitive position in the environment they operate in. In most cases, organisations monitor their competitor's developments in being environmentally sustainable and aspire to emulate those sustainability traits (Mishra & Sharma, 2010:11). The authors further add that in some cases, competitive pressures can cause an entire industry to modify its processes so as to accommodate the new sustainable behaviour. Organisations can also view sustainability as a means of improving their competitive advantage hence foster proactive environmental strategies that will result in cost savings, product differentiation, greater productive efficiency and enhanced image. However, if environmental issues are viewed as unimportant, organisations are less likely to dwell on them and invest their resources on them. They will foster reactive environmental strategies (Ayerbe, Torres & Luna, 2012:195).

3.2.5 Brand value

Hague (2017:para. 5) explains that an organisation's brand is among its intangible assets such as "reputation and customer loyalty". Consequently, any malicious or unsustainable practice that an organisation does has the ability to become available to the public quickly and easily, in turn damaging the image of the organisation. An example of such is the 1999 Nike incident. Nike was exposed by the media and experienced consumer stay away over the unethical treatment of their employees in their sweatshops. This brought a negative impact on Nike business as within a few days the company's brand value dropped $8billion to $7.6billion (Preuss, 2001:347).

3.2.6 Misuse of resources

If sustainability is not implemented properly within the firm's entire supply chain, there is a high possibility of non-renewable resources being misused. The rise in oil prices and other products in the past years, has forced most organisations to shift to corporate sustainability initiatives that resulted in the reduction of waste (Dey, LaGuardia & Srinivasan, 2011:1241). Dutton (2012:30) presents an example of Xerox Canadian Logistics. Fuel efficiency was Xerox's biggest challenge. The fuel they were using totalled nearly 60 percent of their operation costs. In order to resolve this challenge, Xerox implemented lean six sigma

methodology to reduce waste and carbon emissions. Larger vehicles were replaced by smaller ones and fuel efficient vehicles were purchased that did not compromise cargo space or any other business requirements (Dutton, 2012:31). Organisations need to recognise the need of using natural resources efficiently, not only to reduce their carbon footprint but also to save on operational costs.

3.2.7 Government intervention

The South African government is introducing carbon tax as a means of intervening in environmental activities (The Carbon Report, 2015:para. 3). As much as there are strict rules and regulations being initiated concerning air transportation such as restriction of noise pollution and emission standards, control over other modes such as trucking, rail and maritime is significantly less. Pressures resulting from consumers about health issues and carbon emissions are driving most companies to find alternative ways of being sustainable and still profitable (United Nations Environmental Program, 2010:para. 3). It is suggested that if corporate leaders or logistics managers adhere to government legislation of achieving green supply chains, then they are likely to achieve lower costs and greater efficiency (Prokesch, 2012:71).

3.2.8 International standards and regulations

Dey, LaGuardia and Srinivasan (2011:1242) observe that there are various international standards and regulations that soon, all organisations will have to adopt. Firstly, there is ***The United Nations Framework Convention on Climate Change*** (UNFCCC). Kameyama and Kubota (2013:3) mention that the "UNFCCC is an environmental treaty that was proposed in Brazil in 1992 and about 154 nations signed the treaty. The main aim of this treaty was to stabilise the greenhouse gas (GHG) concentration in the atmosphere at a minimum level that would cause less or no harm to the climate system". Secondly, there is ***The Kyoto Protocol*** which is linked to the United Nations Framework Convention on Climate Change (UNFCCC) (European Commission, 2010:para. 3). The main feature of this protocol is that it sets obligatory targets for various countries on how to reduce their GHG emissions. This agreement was first initiated in Kyoto, Japan in 1997 (UNFCCC, 2010:9). The third standard is ***The Copenhagen Summit*** which was held in Denmark, 2009. This was put in place after most world leaders agreed that climate changes are a danger to society and to the natural products of this world, it was put in place to replace the aging Kyoto Protocol (Giddens, 2013:36). Finally, the fourth standard is the ***Cape and Trade***. Under this standard a

government sets "a limit (cap) on the amount of pollutant that can be emitted. Firms or organisations are issued with permits that give them their limit of pollutant. Should they require to increase that limit they have to purchase (or trade) credits from those firms that pollute less. Hence the buyer pays more for pollution while the seller is being rewarded by having reduced emissions by more than what was required" (Center for American Progress, 2011:para.7).

The activities of logistics providers tend to have significant environmental, social and to a certain extent economic impacts. Many large organisations participate in sustainable logistics activities as a goal of achieving competitive advantage against their competitors (Lieb & Lieb, 2013:525). As stated by Prokesch, (2012:70) "adding sustainability into the corporate strategy has become about meeting the expectations of investors while taking into account the long-term impact that operations have on the community and environment". Moreover, Wolf and Seuring (2012: 90) point out that most logistics providers are providing sustainable logistics as it is a requirement by their customers. This is because customers want to be associated with companies that value the environment.

The main motivations as to why logistics companies provide sustainable logistics are summarised in Table 3.

Table 3: Framework of motivation for providing sustainable logistics

Motivation as to why organisations provide sustainable logistics	**Sources**
Desire to do the Right Thing	Lieb and Lieb 2013; Maloni and Carter 2009; Hofmann *et al.* 2014
Pressure from Customers	Collins, Steg and Koning 2010; Sharfman, Shaft and Alex 2009; The Rep 2018
Desire to attract Green Customers	Sarigollu 2009; Ali et al 2011; Manaktola and Jauhari 2011
Competitive Pressures	Mishra and Sharma 2010; Ayerbe, Torres and Luna 2012
Brand Value	Hague 2017; Preuss 2001
Misuse of Resources	Dey, LaGuardia and Srinivasan 2011; Dutton 2012
Government Intervention	The Carbon Report 2015;

	United Nations Environmental Program 2010; Prokesch 2012
International Standards and Regulations	Dey, LaGuardia and Srinivasan 2011; Kubota 2013; European Commission 2010; UNFCCC 2010; Center for American Progress 2011

Source: Compiled by the researcher.

3.3 BENEFITS OBTAINED FROM PROVIDING SUSTAINABLE LOGISTICS

According to the Rochester Institute of Technology, (2017:para.1) the benefits of providing a sustainable supply chain or sustainable logistics are often highlighted as reduced carbon footprint, reduced energy consumption and reduced natural resource consumption. However, there are greater benefits than those highlighted. The Rochester Institute of Technology (2017:para.7) further points out that other, greater benefits that organisations should expect from providing sustainable supply chains or logistics are customer retention, attraction of new customers, improved bottom line financial results, tax and investment incentives and positive public relations resulting from being perceived as a good global citizen. In addition, other benefits of adapting to sustainable operations within an industry include: operational excellence; enhancement of employee relationships; brand reputation; and improved relations with potential investors (Gunasekaran and Spalanzani, 2012:37).

Thrive Global (2017:para.2) reports that consumers tend to demand more from an organisation that values sustainability. Thrive Global (2017:para.2) points out that a survey done by Nielsen indicated that “66 percent of respondents are willing to pay more for a product or service provided by an organisation that is committed to positive social and environmental change”.

Robinson (2015:para.3) clearly explains the five major benefits of providing sustainable logistics. These benefits include: “reducing emissions, reducing the amount of waste products, reducing the amount of energy consumed, alignment with governmental regulations and goals and increasing awareness among customer base”.

3.3.1 Reducing emissions

The European Commission (2017:para.1) highlighted that road transport is recognised as the largest emitter of carbon emissions, accounting for more than 70 percent of GHG emissions in 2014. However, there are strategies that have been put in place to try to reduce GHG emissions. The European Commission (2017:para.7), points out three of these strategies. Firstly, the organisation mentions increasing the efficiency of the transport system, this is through the shift to transport models with lower emission levels. Secondly, the organisation mentions "the speeding up the deployment of low-emission alternative energy for transport" such as the use of renewable fuels. Lastly, the organisation advises on "moving towards zero-emission vehicles", this can be done by acquiring vehicles with advanced engines that have little or no carbon emissions to the environment.

3.3.2 Reducing the amount of waste products

Transportation of waste can cost the company large amounts money and a lot of time. Products or services being moved around for no apparent reason do not add much value to the organisation but instead increase the cost of in transit stock. Woinowski (2013:para.2), states that it is important to only consider necessary transportation of products. It is also vital for the organisation to reduce or get rid of all inventory waste - disposing of all products that the organisation or end consumer is no longer interested in to create space for new products (Woinowski, 2013:para.4).

3.3.3 Reducing the amount of energy consumed

Galos *et al.* (2015:41) mention that in order to reduce energy consumption in heavy goods vehicles (HGVs), organisations should consider reducing the loads or introducing light weight trailers. If the empty weight of the trailers is reduced, the overall energy efficiency of the vehicle will be improved. Odhams *et al.* (2010:1997) point out that there are three categories that lead to energy consumption in HGVs and these are;

1) **Vehicle design factors** – vehicle dimensions, mass, engine efficiency, volume, rolling resistance and material selection.

2) **Logistics factors** – vehicle capacity utilization, speed, routing and supply chain structure.

3) **External factors** – traffic conditions, drive cycle, driver behaviour and weather conditions.

Odhmas *et al.* (2010:1998) further mention that fuel consumption can be reduced by up to 6.5 percent by reducing the trailer unloaded mass by 25 percent. Coming up with the idea of reducing empty trailer mass by revisiting the design of the trailer by incorporating lightweight materials is not a new theory. It has been evolving for the past decade and there has been a growing respect and admiration for it because of the benefits that industries yield from it (Gardiner, 2014:para.4).

3.3.4 Alignment with governmental regulations and goals

Ramanathan, Bentley and Pang (2014:231) observe that environmental sustainability is growing to be an important factor affecting organisations. Different stakeholders, mainly the government, are putting pressure on organisations to apply environmentally friendly initiatives in their way of business operations. Inspirage (2017:para.1) points out government regulations that can impact the supply chain of the organisation. These are the restrictions of hazardous substances, registration, evaluation, authorisation and restriction of chemicals, reduction of waste from electrical and electronic equipment and lastly traceability of pharmaceuticals and medical equipment. The South African government introduced carbon tax, in order to encourage organisations to reduce their carbon emissions. Fewer emissions will result in less carbon tax (Creamer, 2016:para.4).

3.3.5 Increasing awareness among customer base

Encouraging sustainable consumption is vital for an organisation to achieve sustainable development. This is also important as it reduces negative environmental and social externalities and also provides a market for sustainable products (OECD, 2012:7). OECD (2012:10) further mentions how customers are encouraged to save energy by being efficient in using their household appliances, using fuel efficient vehicles and also considering reuse and recycling techniques. Boulanger (2010:7) advises that customers should be encouraged on the dematerialisation and detoxification of current consumption practices and models. Dematerialisation is defined as the cutting down of the material required to satisfy social needs of customers or rather increasing the productivity of materials used to their full capacity. Detoxification on the other hand can be defined as the reduction of toxic attributes in the production or process stages. Dematerialisation and detoxification can be summarised by the four R's: Reduce, Repair, Recycle and Reuse (Boulanger, 2010:8).

Ageran, Gunasekaran and Louis (2012:172) mention more benefits that organisations obtain from providing sustainable logistics. These are **customer satisfaction**, **quality** and **innovation**, and they will be briefly explained as follows;

3.3.6 Customer satisfaction

Lombart and Louis (2012:645) define customer satisfaction "as the measure of how products or services offered by an organisation meet or surpass the expectations or requirements of the customer". Customer satisfaction is likely to cause customer retention, which is cheaper than acquiring new customers. Gallarza, Gil-Saura and Holbrook (2011:181) concur and remark that "customer loyalty is a result of customer satisfaction". Customers are likely to associate themselves with a reputable organisation, environmentally, socially and economically. They consider these organisations as "less risky compared to organisations with the same financial performance but without a reputable image" (Flatt & Kowalczyk, 2011:7).

3.3.7 Quality

There are certain standards that an organisation has to meet in order to be classified as sustainable. These are the International Organisation for Standardisation (ISO) accreditations. Blackman and Rivera (2011:1177) are of the opinion that this accreditation helps organisations achieve producing or delivering quality products and services. Another factor that results in quality products or services is organisations that wish to trade on a global stage (Eilperin, 2010:2). Quality also allows organisations to have a competing edge or competitive advantage over their competitors and also build a well established reputation (Saedi *et al.*, 2015:344).

3.3.8 Innovation

As the organisation strengthens its sustainable practices, there is a likelihood of certain developments that will occur. These developments can be innovative, as the organisation can create new ideas and processes that will in turn achieve the sustainability objectives, at the same time increasing revenue and decreasing costs (Jacobi & Giatti, 2017:2). Innovation also arises from the growing pressure and rising opportunities in the sustainability area. Organisations are finding new and effective ways to improve their processes, products and services to fit the required sustainable practices (Seebode, Jeanrenaud & Bessant, 2012:200).

Therefore, the above factors point out the major benefits of implementing sustainable practices in an organisation and these are summarised in the Table 4:

Table 4: Framework of the benefits obtained from providing sustainable logistics

Benefits obtained from providing sustainable logistics	Source
Reducing Emissions	European Commission 2017
Reducing the Amount of Waste Products	Woinowski 2013
Reducing the Amount of Energy Consumed	Galos *et al.* 2015; Odhams *et al* 2010; Gardiner 2014
Alignment with Government Regulations and Goals	Ramanathan, Bentley and Pang 2014; Inspirage 2017; Creamer 2016
Increasing Awareness Among Customer Base	OECD 2012; Boulanger 2010
Customer Satisfaction	Lombart and Louis 2012; Gallarza, Gil-Saura and Holbrook 2011; Flatt and Kowalczyk 2011
Quality	Blackman and Rivera 2011; Eiperin 2010; Saedi *et al.* 2015
Innovation	Jacobi and Giatti 2017; Seebode, Jeanrenaud and Bessant 2012

Source: Compiled by the researcher.

3.4 CHALLENGES FROM PROVIDING SUSTAINABLE LOGISTICS

Organisations face various challenges when implementing sustainable practices in the foundation phase of their new product development process (Petala *et al.*, 2010:175). Locroix, Laios and Moschuris (2013:9) identify most of these challenges as: estimating hidden costs; lack of clear definitions; integration into management systems; potential barriers to trade; and insufficient and incomparable environmental information. Abbasi and Nilsson (2012:520) concur and list other challenges that organisations experience when implementing sustainable practices in the logistics and supply chain management as, mind-set and cultural changes, and uncertainties.

3.4.1 Estimating hidden costs

Unknown costs are a hindrance when it comes to organisations thinking of implementing sustainable practices within the organisation. These are costs that will be incurred when implementing new systems in the organisation, which will result in improved sustainability practices. These are the costs of training the already available employees into adapting to new systems of operating so as to achieve effective sustainability within the organisation (Anderies *et al.*, 2013:3).

3.4.2 Lack of clear definitions

Most organisations struggle with lack of understanding or interpreting what sustainability is in an organisation. Gittel, Magnusson and Merenda (2012:26) mention that misinterpretation or lack of clear definitions can result in slow response or unsuccessful sustainability strategies. The authors further point out that there are different definitions of sustainability within organisations. Therefore, it is vital that everyone within the organisation understands fully what sustainability entails and also what is required of them in ensuring a successful implementation of sustainability.

3.4.3 Integration into management system

Hardcastle (2013:para.5) posits that most organisations fail to integrate sustainability fully into their systems. This is attributed to the fact that most top management professionals fail to communicate fully what sustainability entails to their employees. Another reason for failure to integrate sustainability into the management system of organisations is that sometimes organisations introduce sustainability purely as a way of attracting customers and following government regulations, not because they fully understand the need (Lacy, Arnott and Lowitt, 2013:485).

3.4.4 Potential barriers to trade

International trade is a major influence of sustainable practices. The World Trade Organisation (2015:1) points out that trade helps to allocate scarce resources. In order to partake in international trade, it is important for organisations to meet world environmental standards. Developing countries are encouraged and supported to increase transparency on trade related matters, to ensure that they meet the green economy goals (World Trade Organisation, 2015:3).

3.4.5 Insufficient and incomparable environmental information

Lack of sufficient information on environmental sustainability is a challenge that most organisations are dealing with. Most organisations struggle to get the required information on how to adopt and implement sustainable practices within the organisation (Perron, 2015:558). Govindad *et al.* (2014:559) point out that there is limited knowledge on how to implement sustainable practices. Organisations lack environmental knowledge, because there is no proper awareness on environmental legislation or environmental impact on organisational activities. There is also no awareness of the benefits of adopting green supply chain management. Furthermore, Govindad *et al.* (2014:559) mention that organisations fear the adoption of new systems, especially considering the fact that they are not fully aware of how the new systems are meant to work.

3.4.6 Mind-set and cultural changes

Mind-set and culture include beliefs, emotions, values, levels of commitment, collective ways of being and norms. Implementing sustainable practices is not only about changing organisational behaviours or systems. It is also about getting the individuals on board with the new system, ensuring their mind-set and cultural beliefs are aligned with those of the organisation (Anderson & Anderson, 2010:6). Employees can be resistant to change, especially if they believe their old processes have been yielding great benefits for the organisation. Transforming their mind-sets and cultural beliefs to that of new sustainable practices can be a challenge to the organisation (Stubbs & Cocklin, 2010:210). This can force top management to provide re-training and communicate clearly the benefits of implementing the sustainable practices.

3.4.7 Uncertainties

Menassa (2011:3576) points out that sustainability brings about certain uncertainties within organisations, and these are associated with costs and the outcome of being sustainable. There is also no awareness of the benefits of adopting green supply chain management. Furthermore, Govindad *et al.* (2014:559) mention that organisations fear the adoption of new systems, especially considering the fact that they are not fully aware of how the new systems are meant to work. These uncertainties - unclear risks, costs or responsibilities - can lead to organisations being reluctant to fully changing their systems and adopting new sustainable practices (Vezzoli *et al.*, 2015:3).

Table 5 depicts a summary of these challenges experienced by organisations when trying to provide sustainable logistics.

Table 5: Framework of the challenges experienced from providing sustainable logistics

Challenges experienced from providing sustainable logistics	Source
Estimating Hidden Costs	Anderies *et al.* 2013
Lack of Clear Definitions	Gittel, Magnusson and Merenda 2012
Integration into Management System	Hardcastle 2013; Lacy, Amott and Lowitt 2013
Potential Barriers to Trade	World Trade Organisation 2015
Insufficient and Incomparable Environmental Information	Perron 2015; Govindad *et al* 2014
Mind-set and Cultural Changes	Anderson and Anderson 2010; Stubbs and Cocklin 2010
Uncertainties	Menassa 2011; Govindad *et al* 2014; Vezzoli *et al.* 2015

Source: Compiled by the researcher.

However, despite the above challenges, Dyllick and Muff (2015:161) note that logistics providers try to resolve these challenges and implement methods that will see them continue being competitive and productive on the market, while preserving the environment at the same time. Therefore, the following section will focus on how the logistics providers try to resolve the already mentioned challenges.

3.5 HOW LOGISTICS PROVIDERS RESOLVE THESE CHALLENGES

While there are challenges that can exist and have no proper solutions, some organisations implemented strategies that can try to deal with all the challenges that they are facing in order to move forward and continue to be competitive. Following are some of the possible solutions for the above mentioned challenges.

3.5.1 Possible solutions for estimating hidden costs

Stewart (2011:52) is of the opinion that organisations should have clear forecasts and improved planning methods when implementing new techniques or introducing a new system that will cost the organisation some money. Stewart (2011:52) suggests that organisations should look at all available options before they settle on their final decision. They should settle for a method that is cost effective and at the same time meets and exceeds their needs and expectations. Ni, Zhang and Souryal (2011:47) on the other hand point out that organisations should acquire a system that can seem expensive to implement in the beginning but which, in the long run reduces all operating costs at the same time preserving the environment, for example implementing solar panels or water harvesting systems in all buildings.

3.5.2 Possible solutions for lack of clear definitions

Stewart (2011:53) suggests that organisations should ensure that their new systems or implementations are communicated clearly to the entire workforce. The new system or implementation should be compatible and easy to use within the entire supply chain of the organisation. Milway and Saxton (2011:para. 10) point out that organisations should break down their goals on sustainability into clear, smaller sub-goals that can easily be understood by their employees. This will also allow the goals to be defined clearly; for example, what tasks need to be carried out and how they should be carried out to achieve the required sustainability goals.

3.5.3 Possible solutions for integration in management system

Sanchez (2015:319) remarks that it is difficult to incorporate new sustainability theories into already existing management systems. It is vital to consider the goals of the organisation that have already been put in place and also the social, economic and environmental criteria. Sanchez (2015:320) further mentions that in order to assess if sustainability concerns are integrated properly into the management system it is important to monitor the outcome and measure if it is achieving what is required. Epstein and Buhovac (2014:13) point out that there are various elements to consider in integrating sustainability successfully in the management system of an organisation. These elements include the information available to help set up the sustainability system, financial resources, and also the risks that could be incurred when implementing the sustainability system.

3.5.4 Possible solutions for potential barriers to trade

For organisations in developing countries that wish to partake in activities like trade with other developed countries, certain environmental measures must be met. Vineetha and Babu (2014:2) mention that these organisations need to acquire all the information needed to know the legislation when it comes to sustainability in trading their goods or services. In addition, the financial aspect of implementing worldly standard sustainability should not be ignored. Equipment and technological systems that are required to make a successful implementation of the sustainability practices must be acquired and all employees must be trained effectively into using the new equipment (Guo, Pan and Fang, 2012:1595).

3.5.5 Possible solutions for insufficient and incomparable environmental information

Government and the private sector need to work together and share all information available on the benefits or effects of being environmentally sustainable (Chandra, 2015:6). In as much as environmental issues are raised everywhere all over the world, the public still needs to be taught in detail on individual impacts to the environment. Islam (2016:31) explains that the public usually blames government agencies for every environmental mishap as they are not aware that their individual contribution is also vital. For example, understanding the importance of recycling as an organisation and as an individual is important so as to achieve sustainability as an organisation and as a country. Islam (2016:32) further mentions that it is important for the public to understand environmental issues, their consequences and the actions that can be taken. This can be done through seminars, workshops and making the information available through articles and journals.

3.5.6 Possible solutions for mind-set and cultural changes

The main reason for pursuing a mind-set or culture change is to create or promote new ways of thinking in the organisation. This cultivates new beliefs, tools and processes that will enhance the success of the organisation (McGuire *et al.*, 2015:5). Basically as the organisations grows and becomes more complex, organisational culture is required to grow into that level of complexity. Butman (2013:para. 11) points out tips of how to shift the mind-set of employees in an organisation. One has to acquire enough evidence, develop practices, create an understandable expression, breathe life into the idea, provide financial benefits, have realistic examples and finally expect backlash. Butman (2013:para. 12) highlights that these tips can help an organisation to successfully transform employee mind-set and culture.

3.5.7 Possible solutions for uncertainties

In trying to solve uncertainties in an organisation, it is important for one to first identify the uncertainties the organisation is facing. It is also important to address future uncertainties (Grote, 2012:11). Pepper (2012:para. 12) mentions six strategies that organisations can use to deal with uncertainties. These are: "(1) using analytical techniques that do not require accuracy, (2) preparing for various outcomes, (3) finding and depending on the predictable elements of the situation, (4) focusing elevation of initiatives on the inputs, (5) remaining agile and quick response and (6) cultivating reputation for extreme trust". Therefore, if an organisation can master these six strategies, it is likely to overcome their uncertainties.

The possible solutions are summarised in Table 6:

Table 6: Framework of how organisations resolve these challenges

How logistics providers resolve these challenges	Source
Possible Solution for Estimating Hidden Costs	Stewart 2011; Ni, Zhang and Souryal 2011
Possible Solution for Lack of Clear Definitions	Stewart 2011; Milway and Saxton 2011
Possible Solution for Integration in Management System	Sanchez 2015; Epstein and Buhovac 2014
Possible Solution for Potential Barriers to Trade	Vineetha and Babu 2014; Guo, Pan and Fang 2012
Possible Solution for Insufficient and Incomparable Environmental Information	Chandra 2015; Islam 2016
Possible Solution for Mind-set and Cultural Changes	Butman 2013; McGuire *et al* 2015
Possible Solution for Uncertainties	Peppers 2012, Grote 2012

Source: Compiled by the researcher.

3.6 SUMMARY

The literature review in this section identified and discussed four motivations behind providing sustainable logistics; the five benefits of providing sustainable logistics were outlined, five challenges of providing sustainable logistics and the possible solutions to those challenges were also pointed out.

The following chapter (Chapter 4) presents the research methodology of this study. This presents insight into and illustrates how data necessary for this study was gathered, the research design, the research approach, the study site, and the participants or target population, sampling method, data collection methods, data quality control, data analysis, ethical considerations and the possible limitations to the study.

CHAPTER 4

RESEARCH METHODOLOGY

4.1 INTRODUCTION

The previous chapter outlined the review of relevant literature of this study. The literature review presented the different aspects of sustainability and sustainable logistics, and how these aspects impact on the organisation.

The purpose of this chapter was to view the different research methods or techniques that used to gather relevant information for this study. The research adopted allowed the researcher to gather the relevant information that resulted in obtaining the appropriate results and drawing appropriate conclusions in order to address the research objectives of this study.

This chapter illustrates the following sections: the *significance* of the study; the *research objectives* derived from the research problem; the *research design* used to collect the relevant data to comply with the set objectives; and the research approach adopted. Furthermore, the chapter provides details on the *research instrument* chosen to collect data, and the method used to *analyse the data*, while ensuring that the collected data is *credible* and *trustworthy*. To conclude, the chapter deals with the *ethical considerations* section and the *limitations of the study* that hindered the researcher from discovering further relevant information concerning the study.

4.2 SIGNIFICANCE OF THE STUDY

Sustainable logistics covers the operational aspects of an entire supply chain and focuses on analysing the negative environment implications that result from logistics activities (Velazquez, n.d.:para.1). Siegel (2011:para.15) point out that despite environmental implications, logistics companies also implement sustainability to achieve competitiveness and improve their bottom line.

Studies on the benefits and challenges of sustainable logistics in the South African transport industry are limited. Therefore, it is envisaged that the findings and recommendations of this study will contribute to the existing body of knowledge by identifying areas through which sustainable logistics in the transport industry in South Africa can be improved.

4.3 RESEARCH OBJECTIVES

The following objectives were used as a guideline by the researcher to acquire the relevant information pertaining the study, and also helped to point out which methods should be used to yield the best results;

- To provide insight into the motivation behind Transport Company X providing sustainable logistics to its customers.
- To identify the benefits that Transport Company X derives from providing sustainable logistics to its customers.
- To identify the challenges that Transport Company X experiences in providing sustainable logistics to its customers.
- Determine how Transport Company X overcomes identified challenges.

In order to achieve the above objectives, a research roadmap was designed. Table 7 illustrates the steps that can be used for any study and these are relevant for this study.

Table 7: A research roadmap

Step 1	Formulate and Clarify Research Topic
Step 2	Critically Review the Literature
Step 3	Understand Theory and Approach
Step 4	Formulate Research Design
Step 5	Negotiate Access and Address Ethical Issues
Step 6	Plan Data Collection and Collect Data
Step 7	Analyse Data using one or both of: Quantitative and Qualitative Methods
Step 8	Write Project Report and Prepare Presentation
Step 9	Submit Project Report

Source: Saunders, Lewis and Thornhill, 2007: 10

The purpose of **Step 1** is to assist the researcher to brainstorm his/her ideas to formulate a suitable topic for the research study. Once the suitable topic is formulated, it is critical to select the research study strategy, the data collection method and the data analysis technique that will be relevant for the chosen topic. In selecting the topic for this study, availability of literature was considered, and so was the target population for collection of data. The topic for this study is *"Benefits and Challenges of providing sustainable logistics: A Case as a South*

African Logistics provider". The researcher was granted permission to conduct the study at Transport Company X, by senior management.

Step 2 outlines the important factors to ensure an in-depth review of the relevant literature. Primary, secondary and tertiary literature sources are reviewed, with relevance to the study. At this stage it is important to record only data that is relevant to the study. The literature review in chapters 1, 2 and 3 provided insight into the logistics and/or sustainable logistics in South Africa, an overview of the motivation behind providing sustainable logistics, benefits and challenges of providing sustainable logistics and how these challenges are solved. The literature review formed the basis to draw up the questions in the interview guide for this study.

Step 3 deals with understanding the research theory and approach. It is important for the researcher to have a clear understanding of his/her own values and the impact these might have on conducting the study. Saunders, Lewis and Thornihill (2007:10) mention that "the research theory contains important assumptions about the way in which the researcher views the world and these assumptions underpin the research strategy and the methods chosen as part of that strategy".

Step 4 deals with the formulation of the research design. At this stage it is important to ensure the credibility of the research findings by choosing the relevant research design method. A research design is important as it is the roadmap that will guide the entire research study.

Step 5 focuses on negotiating access and addressing ethical issues. It is important to take note of all possible ethical issues that can be experienced in the different phases of the research study. Therefore, prior to carrying out any empirical research, ethical clearance was granted by the University of KwaZulu-Natal.

Step 6 deals with the planning of collecting data. Data can be collected using one or more of the following methods: secondary data, observation, in-depth and semi-structured interviews, questionnaires, surveys and focus groups. When a data collection method is chosen, it is important for the researcher to explain why the chosen data collection method is necessary and how it will achieve the research objectives of the study.

Step 7 focuses on analysing data using one or both qualitative and quantitative methods. Should the researcher choose to use quantitative methods, he/she should understand different types of data, how to code, create a data matrix, explore relationships and examine trends.

When using the qualitative method, the researcher needs to know how to conduct manual analysis and use computer aided qualitative analysis software. In addition, the researcher needs to be aware of the challenges of transcribing data collected.

Step 8 deals with the writing of the project report and preparing for presentation. This stage deals with the format of writing the research project, the style and content of the research study.

Step 9 is the final stage of the research study, which is submitting the research project.

4.4 RESEARCH DESIGN

Research designs are a type of inquiry within quantitative, qualitative and mixed methods approaches that a researcher uses to obtain specific directions for a procedure in a research design sometimes known as "strategies on inquiry" (Creswell, 2014:11). The study is exploratory and descriptive.

This study is exploratory in the sense that it sets out to discover the benefits it derives and the challenges Transport Company X experiences from providing sustainable logistics. Descriptive data is that data which targets to describe the concept, the aim was to provide an overview of the sustainable logistics at Transport Company X.

Table 8 differentiates between these two designs.

Table 8: Differences between explorative and descriptive researches

	Exploratory	**Descriptive**
Objective	Durrheim, TerreBlance and Painter (2006:47) indicate that exploratory studies are used to make introductory investigations into relatively unknown areas of research. This is research that is used for a problem that has not been clearly studied to establish priorities and develop rational definitions and improve the final research design.	Using descriptive research helped the researcher to gather information and be able to describe the attributes of the research intent (Sekaran & Bougie, 2013:97).

Characteristics	This design is characterised by its ability to provide qualitative data, it does not offer the solution to the problem but helps understand the objective of the research (Welman, Kruger & Mitchell, 2011:68).	This design is used to describe a situation or a population. Bickman and Rog (2009:24) point out that descriptive research studies can provide answers to questions such as "what is?" or "what was?" Investigations can answer "why?" or "how?"
Methods	Three methods can be used in conducting exploratory research. These are: literature review, conducting interviews with experts in the subject and focus group interviews.	The three methods that can be used to conduct descriptive research are: observational methods, case studies and survey methods

The purpose of this research study was to identify benefits and challenges of providing sustainable logistics at Transport Company X, to point out the motivation behind providing sustainable logistics, the benefits obtained from providing sustainable logistics, challenges experienced and finally, how those challenges are mitigated.

4.4.1 Case study research

A case study approach was adapted to: (1) identify the benefits of providing sustainable logistics and (2) point out the challenges experienced in providing sustainable logistics. A case study research is naturally both exploratory and descriptive and can provide in-depth information about the situation at hand (Terreblanche, Durrheim & Painter, 2007:461; Bickman & Rog, 2009:167; Bernard & Ryan, 2010:93).

"A case study is an empirical inquiry that investigates a contemporary event within its real life context, especially when the boundaries between the event and context are not clearly evident" (Yin, 2014:13). For case studies, five elements of a research design are especially important and these are: (1) study questions, (2) study propositions, (3) unit of analysis, (4) linking data to propositions and (5) criteria for interpreting the findings.

Study questions: This looks at the substance of the questions. Yin (2014:20) states that these are formed in terms of "who", "what", "where", "how" and "why"- they formulate the research strategy to be used. Therefore, the primary task is to clarify the nature of the study questions in this regard.

Study propositions: These focus their attention to something that should be scrutinised within the scope of the study. For example, "how" and "why" questions which capture what the researcher is really interested in answering, leading to the case study as the appropriate strategy (Yin, 2014:21). These "how" and "why" questions do not necessary point out what the researcher should study; it is the proposition that moves the researcher to the right direction (Avan & White, 2001:51). For example, in this study, Transport Company X could be providing sustainable logistics because they derive certain benefits. This proposition then directs the researcher where to look for relevant information.

Unit of analysis: This element focuses on defining what the "case" is. This is the core topic or problem that is being analysed in a study. It is the "what" or "who" that is being studied (Yin, 2014:22). Individuals, groups, artefacts, geographical units and social interactions, can all be regarded as a unit of analysis in a study. The analysis done in a study, determines what the unit is, therefore different analysis in the same study may have different units of analysis.

Linking data to propositions: This element can be done in numerous ways. A famous approach for case studies is "pattern matching" previously described by Campbell (1975:180), whereby the same case may contain various pieces of information similar to some proposition. If two patterns are considered opponent propositions, the pattern matching technique is a way of bringing the data together with the propositions.

Criteria for interpreting the findings: Currently for this last component, there is no particular way of interpreting the findings. It is hoped that if the various patterns are different, then the findings can be interpreted in terms of comparing at least two rival propositions (Yin, 2014:26).

However, generalisations cannot be made from one single case study. Denzin (2010:178) defines a case study as "a strategy for doing research which involves an empirical investigation of a particular contemporary occurrence within its real life context, using multiple sources of evidence". Therefore, this research is useful as it aimed to answer the "how" or "why" questions about an event which the researcher has little or no control over.

4.5 RESEARCH APPROACH/ PARADIGM

The research approach looks at more than just the type of data used. It focuses on the overall direction of the research and the type of conclusions that will be drawn from the study (Winch

et al, n.d.:para.3). There are currently three approaches or paradigms which make up most research and these are; quantitative research, qualitative research and mixed method approach. Quantitative research is used to deduce the problem by way of gathering numerical data or data that can be transformed into useable statistics. This type of research uses measurable data to uncover facts and reveal patterns in research (Wyse, 2011:para.3). Qualitative research on the other hand is basically exploratory research. It provides depth into the problem or helps to develop the idea or hypotheses for potential quantitative research (Wyse, 2011:para.2). Lastly a mixed methods approach is a combination of both quantitative and qualitative research. The assumption behind this research is that the combination of both quantitative and qualitative research provides a clearer understanding of the research problem than either approach alone (Creswell, 2014:4).

For this particular study, qualitative research was used to gain an understanding of the research problem. Secondary data like academic journals, company websites, and relevant literature are some of the methods of data collection used in qualitative research, which were appropriate in this study. QSR International (2014:para.1) defines qualitative research as "research about exploring issues, understanding phenomena, and answering questions by analysing and making sense of unstructured data". This can be done via focus groups or in-depth interviews, as this type of research aims to acquire in-depth data. In this study, data was gathered through face-to-face semi-structured interviews and observation of relevant participants in the organisation.

4.6 STUDY SITE

This study took place in the KwaZulu Natal (KZN) region. The participating organisation that was included in this study was 'Transport Company X' a pseudonym for a logistics company located in Pietermaritzburg. The study focused on this organisation because of its ease of accessibility. Furthermore, it is a sizeable company which has implemented sustainable logistics.

4.7 TARGET POPULATION

Taylor, Bogdan and DeVault (2016:30) define the target population as an entire group of people or objects that researchers want to draw and generalise their conclusions from. In this

study the target population was the personnel from different departments at Transport Company X. The personnel from the different departments consisted of one thousand three hundred and sixteen (1316) employees.

4.8 SAMPLING DESIGN

Probability sampling and non-probability sampling are two types of sampling methods that are used. In probability sampling, each segment of a known population is represented in the sample (Adwok, 2015:95). This means that in probability sampling, each sample has an equal probability of being chosen. Brus, Kempen and Heuvelink (2011:397) define non-probability sampling as a sampling technique where the likelihood of any individual being selected for a sample cannot be calculated. Therefore, in this sampling design, it is not known which member of the group will be selected for the sample. A non-probability convenient sampling technique was adopted to choose the participating organisation. The participating company for this research was chosen because of its ease of accessibility hence the use on non-probability convenient sampling.

The type of non-probability sampling that was used in this study to choose the participants is that of purposive sampling. In non-probability sampling, each sample does not have an equal probability of being chosen. Non-probability sampling is usually used for case study research (Black, 2010:27). Purposive sampling, also referred to as judgmental, selective or subjective sampling is synonymous with qualitative research. The researcher selected a sample of six experts according to the type of the topic and their skill concerning that topic (Palys, 2008:697). This was done to avoid bias. Smith and Noble (2014:100) define bias as concentration on, or an interest in, one particular party or subject. Bias can be eliminated by using multiple people to code the data collected, verifying more data sources or triangulation, review findings with peers and check for alternative explanations (Smith & Noble, 2014:101).

Table 9 lists the individuals who participated in the empirical research study.

Table 9: List of participants

DEPARTMENT	PARTICIPANT	DATE	TIME START	TIME TAKEN
Operations	Participant A	24/07/2018	12:05	26mins 58secs
Warehouse	Participant B	25/07/2018	08:00	28mins 55secs
Operations	Participant C	25/07/2018	11:00	31mins 59secs
Transportation	Participant D	15/08/2018	11:00	15mins 29secs
Workshop	Participant E	16/08/2018	12:00	14mins 45secs
SHEQ, Legal and Wellness	Participant F	22/08/2018	12:00	25mins 43secs

4.9 DATA COLLECTION METHODS

Primary data in this study was collected through the interviewing of six participants. Voice recordings were made so as to transcribe the exact information without distorting or losing the relevant information. Face to face, in-depth interviews were conducted, using a semi-structured interview guide. In a semi-structured interview guide, the researcher provides a guideline based on her research interests and interview guide but allows flexibility by allowing the participants to be more spontaneous and give narrative responses (Brinkman, 2014:1009). The participants were contacted two weeks prior to set an interview date and time that suited them.

Triangulation was also used in this study, as this allows more than one method of data collection. The researcher also collected data through participants, and structured observations. Oslen (2004:46) highlights that triangulation techniques are helpful for reviewing two or more sources and used to provide confirmation and completeness, which brings balance between two or more types of research. This helps to improve the credibility and validity of the study.

In order to gain adequate data for this research, secondary data was collected as well. This included the review of academic journals, textbooks, dissertations, theses and articles. Secondary sources like academic journals provide reliable backup because they have been previously researched, therefore there is an in-depth understanding of literature relating to the ground breaking aspects of the researcher's study (Coldwell & Herbst, 2004:31).

Table 10 illustrates how the data collection techniques used was useful in gathering the primary data needed to help achieve the research objectives.

Table 10: Matching objectives and data collection techniques for primary data

RESEARCH OBJECTIVE	TECHNIQUE ADRESSING THE OBJECTIVE
To provide insight into the motivation behind Transport Company X providing sustainable logistics to its customers	This objective was achieved through a qualitative investigation which consisted of in-depth semi-structured interviews
To identify the benefits that Transport Company X derives from providing sustainable logistics to its customers	This objective was achieved through a qualitative investigation which consisted of in-depth semi-structured interviews
To identify the challenges that Transport Company X experiences in providing sustainable logistics to its customers	This objective was achieved through a qualitative investigation which consisted of in-depth semi-structured interviews and participant structured observation
Determine how Transport Company X overcomes the identified challenges	This objective was achieved through a qualitative investigation which consisted of in-depth semi-structured interviews

4.9.1 Interviews

Interviews allow the researcher to gather diversified open-ended qualitative data. Interviews are a personal way of gathering information concerning a particular topic between the interviewer and the participant (Rabionet, 2011:564; Rowley, 2012:261). The advantage of using interviews is that they enable participants to share their experiences of the topic at hand using their own words.

In order to realise the objectives of this study, semi-structured in-depth interviews were conducted using a semi-structured interview guide.

4.9.2 Interview guide

An interview guide helps the researcher to reach the interview goals set. Unlike structured interviews, semi-structured interviews have a flexible and fluid structure which allows the interviewer to engage with the participant in a friendly manner, making the participant at ease (Rabionet, 2011:564). The semi-structured interview guide used contained open ended questions, as they were exploratory in nature (see Appendix A). Powell and Guadagno (2008:383) note that open-ended questions provide the researcher with rich qualitative data as

the participant is not limited to a set of replies but can express him- or herself when answering these questions.

The interview guide was designed based on the theoretical framework, derived from the findings in the literature review in terms of the objectives of this study. The interview guide was designed in such a way that the answers or responses derived were clear and unambiguous.

The interview guide consisted of the following sections;

Section 1: Company profile

This section provided general information about the participant and their role in the organisation. The section also looked at the size of the organisation and the qualifications that the individual holds in the company in terms of sustainability.

Section 2: Motivation behind providing sustainable logistics

The aim of this section was to provide insight into the reasons why Transport Company X provides sustainable logistics. Questions of this section which aimed at outlining the drive behind providing sustainable logistics were derived from the findings of the literature review.

Section 3: Benefits of sustainable logistics

This section aimed to provide the benefits that Transport Company X reaped from providing sustainable logistics. Questions in this section were also derived from the findings in the literature review.

Section 4: Challenges faced in providing sustainable logistics

The purpose of this section was to highlight all the challenges experienced by Transport Company X in executing sustainable logistics practices. The questions in this section were designed from the findings in the literature review.

Section 5: Overcoming the identified challenges

The aim of this section was to provide the strategies that the organisation has in place to overcome all the challenges that it stated in Section 4. Possible solutions for each of the identified challenges are highlighted in this section. The questions were designed based on the findings in the literature review.

4.9.3 Pre-Testing

The interview guide was pre-tested on one of the lectures in the marketing field who is also an expert in research methodology. This was not done to obtain results, but to ensure that the interview guide contained clear wording and to identify any potential problems that the researcher could come across prior to conducting the actual study.

4.10 OBSERVATION

Observation basically refers to looking at or watching something without trying to influence it and simultaneously recording it for later use (Willig, 2013:32). Observation also concerns "the planned watching, recording, analysis, and interpretation of behaviour, actions or events" (Sekaran & Bougie, 2016:127). Furthermore, Sekaran and Bougie (2016:128) highlight that there are various approaches of observation. These can be characterised by four key elements that highlight the way observation is conducted, namely, "(1) control, (2) whether the observer is a member of the group that is observed or not, (3) structure and (4) concealment of observation".

Control: This looks at whether the observations are done in a controlled or uncontrolled setting. A controlled observation occurs when the researcher manipulates the setting; this is when the observation is done under carefully arranged settings (Cooper, Lewis & Urquhart, 2014:3; Sekaran & Bougie, 2016:128). Uncontrolled observation on the other hand, is when the researcher makes no attempt to control or manipulate the setting. It is when observation is done in a natural setting (Sekaran & Bougie, 2016:128).

Whether the observer is a member of the group that is observed or not: This is participant versus non-participant observation. Participant observation is defined by Cooper *et al.*, (2014:4) as "the conscious sharing in life activities, and on occasion in the interests and effects of a group of persons". It is when the researcher is collecting data by participating in the daily lives of the organisation that is under study. In the case of non-participant observation, the researcher is not directly involved with the group that is observed, but observes from a distance, without becoming an integral part of the organisation (Sekaran & Bougie, 2016:128).

Structure: This highlights the extent to which the observation is focused, predetermined, systematic, and quantitative in nature. In a setting where the researcher has predetermined a

set of categories of activities that are planned to be studied, that is called a structured observation. The method of recording the observations can be designed in a format that suits the goal of that research (Sekaran & Bougie, 2016:129). On the other hand, observation may be part of the plan, where the researcher will record everything that is observed. In such a study this will be unstructured observation (Mulhall, 2003:307).

Concealment of observation: This focuses on whether the people being studied are made aware that they are being studied or not. In a concealed observation, actions of members being observed are not influenced by the awareness that they are being observed, whereas, with unconcealed observation, the members being observed may be obstructed and their behaviour may change during the study, altering the results that the researcher is wishing to achieve (Sekaran & Bougie, 2016:129).

In this study, participant, structured observation was used to achieve the specific objectives of the study. In this observational study, the researcher planned a predetermined set of activities to be observed, aimed at answering the specific objectives of the study at hand. Due to the fact that the researcher was part of the company being observed, it was essential to have specific activities to be observed so the study was not overwhelmed by large amounts of irrelevant data. Thus the researcher used as observation checklist.

4.10.1 Observation checklist

An observation checklist is defined by Creswell and Plano Clark (2007:44) as a structure for observation that allows the researcher to record behaviours during the observation process, with minimum interviewer effect on behaviours. Sometimes it is referred to as a tick list or tick chart. The researcher drafted the observation checklist prior to commencing the observations. This was done so as to focus on the specific activities aimed at answering the research objections. A copy of the checklist is attached as Appendix C.

4.11 DATA ANALYSIS

Data analysis is done to ensure that the data collected is clear, understandable and unveils meaningful and necessary conclusions that answer the stated research objectives. The motivation behind analysing data is to obtain information that is practical and applicable. According to Mast and Kemper (2009:366) data analysis is "the art or science of examining raw data with the purpose of drawing conclusions about that information". Fortune, Reid and Miller (2013:12) on the other hand point out that data analysis helps the researcher to organise, manage and analyse the large volume of data by breaking it down to smaller understandable components.

4.11.1 Content analysis

Qualitative data analysis was done for this study using the content analysis process. Neuendorf (2017:3) states that content analysis focuses mainly on analysing the meaning or how many times a phrase or term is used by an individual. Content analysis is a frequently used method for qualitative research analysis. Furthermore, Serekan and Bougie (2013:352) describe content analysis as a "survey research method used to assess the typical contents of all recorded communication".

Inductive and deductive content analysis are two types of content analysis. Deductive content analysis is used in a structure where the data being analysed is derived from previous knowledge. Inductive content analysis on the other hand is used in scenarios where there are no previous studies on the topic at hand (Elo & Kyngas, 2008:108). In this study a deductive content analysis was used to test a previous theory in a different scenario.

Content analysis bears the same resemblance to the technique of thematic analysis (Drisko & Maschi, 2015:85). For the purpose of this research, data was recorded by handwritten notes and by audio-recording the interviews to be later transcribed. This was followed by analysis of the primary data through a process of coding, which allocated different segments of the transcripts into similar categories. The process involved the identification of similar content through reading and re-reading of the transcribed data. Creswell and Plano Clark (2007:88) state that this is a form of pattern recognition within the transcribed data, where similar content becomes the categories for the analysis. This data was collected through in-depth semi-structured interviews conducted with participants from Transport Company X.

4.12 DATA QUALITY CONTROL

Mast and Kemper (2009:369) explain data quality control as the credibility and trustworthiness of data efficiency. It refers to how the researcher measures what they are supposed to measure and that it measures in a consistent manner.

4.12.1 Credibility

Credibility concentrates on the actual research and refers to the confidence in how well the data collected addresses the desired focus (Polit & Beck, 2012:3). Olivia (2017:paragraph 2) on the other hand states that "credibility ensures that the researcher can link the study's findings with reality in order to analyse the truth of the study".

4.12.2 Trustworthiness

Trustworthiness is used to support the argument presented by the researcher that the findings are "worth paying attention to" (Elo *et al.*, 2014:2). There are four alternatives for assessing trustworthiness, which are **dependability**, **conformability**, **transferability** and **authenticity**. **Dependability** refers to unchanging data or information over a certain period of time and under different situations. **Conformability** refers to the likelihood for similarity between two or more independent people about the data's accuracy, relevance or meaning. **Transferability** refers to the understanding that findings can be generalised or transferred to other settings or groups. Lastly, **authenticity** refers to the extent to which researchers can fairly and faithfully show a range of realities (Polit & Beck, 2012:4).

In this study credibility was assured as the researcher reviewed the transcribed text data and analysis before it was written up. Dependability was assured by having an outside researcher from the School of Humanities review the data collection, data analysis and the results of the study to confirm the accuracy of the study and to ensure the findings are supported by the data collected. Conformability was assured by means of triangulation, keeping a journal, documentation and interview recordings. With regard to transferability, Lincoln and Guba (1985:316) best describe it as "not the researcher's task to provide an index of transferability, however, it is his or her responsibility to provide the database that makes transferability judgments possible on the part of other researchers". Hence, in this study, transferability was assured by thick description, which is a detailed account of the experiences of the researcher

during data collection. Lastly, authenticity was assured by providing a voice recording and appreciation of each participant's viewpoint.

4.13 ETHICAL CONSIDERATIONS

Ethics basically means moral principles that govern or determine an individual's behaviour or the conducting of an activity (Hitt, 2008:42). The University of KwaZulu Natal Ethics Committee issued ethical clearance for this study before any field/ primary research was conducted (See Appendix E). Prior to conducting the interviews, all participants involved in the study were given an informed consent form (see Appendix B) to complete and sign. The informed consent form states that, participants were participating in the study of their own free will and should they wish to withdraw from the study for any reason, they were free to do so. Any confidential information collected during the interviews would be kept confidential and participants were assured of anonymity. All ethical considerations were observed in this study, and this guided the researcher to conduct herself in an ethical manner. All secondary information was referenced accordingly, using the Harvard Referencing style.

4.14 LIMITATIONS TO THE STUDY

There are various limitations that could have hindered the researcher from finding out all information needed for this study, this information can be discovered should the study be conducted elsewhere. For example, in this research, the limitations are outlined as follows;

- This study focuses on one logistics provider only. Other logistics providers in South Africa were not included in this study, therefore, this means that the findings of the study cannot be generalised for all the logistics providers.
- Benefits and challenges were identified through the literature review and interviews with participants of the participating company; therefore, it is likely that not all the benefits derived or challenges faced by Transport Company X from providing sustainable logistics were identified.
- Furthermore, since not much research has been done on the study at hand, the researcher had to depend on secondary data to gather the necessary information. Some of this

secondary data does not cover the topic fully or in a comprehensive manner as compared to what the researcher was really looking for.

4.15 SUMMARY

This chapter presented the research designs and methods that were carried out to conduct the field research for this study. The study is exploratory and descriptive, using a case study approach to derive a deeper understating into the motivation behind Transport Company X providing sustainable logistics, the benefits derived from providing sustainable logistics, challenges experienced in executing sustainable logistics and lastly how the organisation overcomes all the identified challenges. Empirical data was collected using in-depth semi-structured interviews. Participants from different departments were chosen for this research. The interview guide designed was based on the theoretical framework derived from the findings of the literature review. The interview guide contained open-ended questions, covering the objectives of this study.

Credibility and trustworthiness of the data collected were done by audio-recording all the data and having another individual listen to the recordings to ensure that the researcher was not biased in transcribing the data. The questions in the interview guide were all phrased in simple terms to ensure that the researcher collects the data relevant to the study. Ethical recommendations required for this study were strictly followed. Potential limitation expected in connection with the research methodology followed were identified and addressed.

The results obtained from collecting the empirical data are presented for discussion and conclusions drawn in accordance with the objectives of this study in the next chapter, Chapter 5.

CHAPTER 5

PRESENTATION, ANALYSIS AND DISCUSSION OF THE FINDINGS

5.1 INTRODUCTION

The previous chapters of this study initiated the research questions and research objectives. An in-depth literature review was conducted to identify the benefits and challenges that transport and logistics company face when providing sustainable logistics. The preceding chapter provided the research methodology and methods that guided this study.

This chapter focuses on the analysis of the empirical data that was collected from the research sample during the field research. The findings from the data collected are presented, analysed, discussed and conclusions are drawn in connection with the objectives of the study. The empirical research comprised semi-structured in-depth interviews and observation, using an observation checklist. The main aim of this study is to determine the benefits and challenges of providing sustainable logistics a South African Logistics provider experiences. Therefore, this chapter presents the findings from data collected at Transport Company X, a logistics company in Pietermaritzburg, South Africa.

The motivation, benefits and challenges were identified from the literature review, and the semi-structured in-depth interviews that were conducted with six different relevant participants at Transport Company X. Observation focused on one of the primary objectives, which was the challenge Transport Company X faced in providing sustainable logistics.

This Chapter starts by revisiting the objectives of the study. This helps the researcher in identifying which objectives have been met in the previous four chapters, and which objectives still need to be addressed in this particular chapter. The chapter covers issues that were discussed with the participants at Transport Company X. Thereafter, the data collected is presented in a deductive content analysis. Each category and its specific content are discussed separately so as to provide the reader with a comprehensive understanding of each content and category. Findings from the participants and structured observation are presented in a separate section.

This chapter highlights the findings obtained from conducting interviews at Transport Company X and concludes with a summary of the main issues discussed during the collection of the empirical data.

5.2 REVISITING THE RESEARCH QUESTIONS AND OBJECTIVES

It is important to re-visit the research questions and objectives of this study, prior to discussing the findings and data analysis to establish the main focus of this study. To re-cap, the main question of this study was:

"What are the benefits and challenges of providing sustainable logistics: A case at a South African Logistics provider?"

Table 11 is a summary of the research questions and objectives of this study. It highlights all the objectives and the chapters that relate to the attainment of those objectives.

Table 11: Research objectives and chapters covering the objectives

RESEARCH OBJECTIVE	**EMPIRICAL DATA**
PRIMARY OBJECTIVES	
To provide insight into the motivation behind Transport Company X providing sustainable logistics to its customers	Chapter 5, Section 5.6.1.1 to 5.6.1.6
To identify the benefits that Transport Company X derives from providing sustainable logistics to its customers	Chapter 5, Section 5.7.1.1 to 5.7.1.8
To identify the challenges that Transport Company X experiences in providing sustainable logistics to its customers	Chapter 5, Section 5.8.1.1 to 5.8.1.6
To determine how Transport Company X overcomes the identified challenges	Chapter 5, Section 5.9.1.1 to 5.9.1.6

It can be seen from Table 11, that the objectives have been discussed in this chapter as they were achieved through empirical research of the study. The following section presents and analyses the data collected to draw conclusions and recommendations with regard to their meanings.

5.3 INTERVIEWS WITH TRANSPORT COMPANY X EMPLOYEES

This section presents the response of six participants (see Table 12) at Transport Company X. The purpose of the interviews was to provide insight into the motivation behind Transport Company X providing sustainable logistics to its customers, to identify the benefits, to identify the challenges that Transport Company X experienced from providing sustainable logistics to its customers, and to determine how Transport Company X overcame the identified challenges.

Table 12: List of participants and their details

Participants	**Position in the Company**	**Years in the Company**	**Age Group**	**Qualifications/Accreditation**
Participant A	Regional Operations Manager	8 Years	21-30	MBA, IS0 9001:2015
Participant B	Acting Operations Manger	20 Years	31-40	RTMS, ISO 9001: 2015
Participant C	National Consulting Manager	8 Years	41-50	Degree, ISO 9001: 2015
Participant D	Training Facilitator	3 Years	51-60	Diploma, ISO 9001: 2008, ISO 9001: 2015, ISO 18001, ISO 14001
Participant E	Technical Executive	35 Years	51-60	Diploma, ISO 9001: 2015
Participant F	SHEQ, Legal and Wellness Manager	15 Years	51-60	Degree, ISO 9001: 2008, ISO 9001: 2015, ISO 18001, ISO 14001, RTMS

The following section focuses on the analysis of the empirical data collected during the interviews. Content analysis was used to present the findings of this data.

5.4 ANALYSIS OF DATA: SECTION 1

5.4.1 Company profile of Transport Company X

Prior to presenting the data and showing all the themes derived in the content analysis, it is important to give an overview of the company profile. The sample size was discussed in Chapter 4, Section 4.8. However, specific information such as the participants' position in the company, their years in the company, roles in the company, qualifications (if any), total number of employees, and what accreditations they had in terms of sustainability were not dealt with as they form part of empirical data.

Transport Company X was an independently owned transport and logistics services company. It offered world class services and value added distribution channels within South Africa and neighbouring countries (derived from Transport Company X website, 2018). The company was established over 35 years ago, and has acquired stability and credibility which is expected by its clients. The company has a comprehensive infrastructure catering for line haul operations and local distribution of high-volume, FMCG, industrial and packaging products, included in the service is containerised cargo and warehousing services (derived from Transport Company X website, 2018).

5.4.1.1 Position held in the Company

In this study, the participants were a part of top management; from Participant A to participant F. Letters were used in order to avoid disclosing their identity, thus maintaining confidentiality and anonymity. Participant A, was the Regional Operations Manager, Participant B, was the Acting Operations Manager, Participant C, was the National Consulting Manager, Participant D was the Training Facilitator, Participant E was the Technical Executive and Participant F was the SHEQ, Legal and Wellness Manager.

5.4.1.2 Roles and years in the Company

The participants interviewed had all been with the company for a number of years. Each of them played a significant role and added needed value to the company, ensuring that it provided that world class transport and logistics service it seeks to provide. Participant A had been with the company for more than five years, he was in charge of the operations, in the KZN region. Participant B had been with the company for 20 years. He was also part of operations and he ensured that the wheels of the company were kept turning. Participant C had been with the company for eight years and was in charge of all customer relationships. He

did consulting for the company and acquired customer needs and specifications. Participant D had been with the company for three years and ensured product handling training for blue collar workers and driver training facilitator. Participant E had been with the company for 35 years and he was the head of the technical department and tyre department. Lastly, Participant F had been with the company for 15 years, he was in charge of all safety, health and environment issues within the company.

5.4.1.3 Size of Company and Accreditation held by participants

Transport Company X had approximately 1300employees throughout different sites in South Africa. Head Office had approximately 300employees. Most, if not all the employees have been trained on International Organisation for Standardisation (ISO). The company was currently using ISO 9001: 2015. This enabled the company to meet the quality standards that customers require and also gave the company a competitive advantage (Lakhal, 2009:638). All participants in this study were male and they indicated how they are ISO9001:2015 accredited (see Table 12).

5.5 ANALYSIS OF DATA: GENERAL

The purpose of this section is to outline the benefits and challenges faced by Transport Company X and how the solutions were put in place to overcome the identified challenges.

The findings were coded and categorised and grouped in a simplified way. As previously discussed in Chapter 4, content analysis was used to analyse the empirical data. Table 13 presents the content analysis which shows the codes and themes obtained from the findings of the interviews.

Table 13: Codes and Themes obtained from the findings of the interviews

Objective	Key Elements From the Literature Review	Common Themes from the Findings	Codes From the Primary Data
Motivation Behind Providing Sustainable Logistics	Desire to do the right thing Pressure from customers Desire to attract green customers Competitive pressures Brand value Misuse of resources Government interventions International standards and regulations	Customer Government legislation Competitors Savings Carbon footprint Corporate social responsibility	Green Initiatives Aerodynamics Month to month measuring of carbon footprint by SHEQ Recycling across all sites Naming and shaming Driver training Route optimisation Use of Euro 5 vehicles
Benefits of Sustainable Logistics	Reducing emissions Reducing the amount of waste products Reducing the amount of energy consumed Alignment with government regulations and goals Increasing awareness among	Reducing Carbon footprint Customer retention Positive public recognition Aligning with regulations Competitive advantage Future generations Vehicle optimisation Tax reductions	Phase out older and get new euro 5 vehicles Weekly monitoring of kilometres Measure driver performance Recycling

	customer base Customer satisfaction Quality Innovation		
Challenges Faced in Providing Sustainable Logistics	Estimating hidden costs Lack of clear definitions Integration into management system Potential barriers to trade Insufficient and incomparable environmental information Mind-set and cultural changes Uncertainties	Lack of resources Different cultural backgrounds Lack of awareness SHEQ to be at all sites Lack of 10ppm fuel Customer Buy-In	Roll out SHEQ to all sites Use of latest technology trucks Environmentally friendly tyres
Overcoming the Identified Challenges	Possible solutions for estimating hidden costs Possible solutions for lack of clear definitions Possible solutions for integration in management system Possible solutions for potential barriers to trade Possible solutions for insufficient and incomparable environmental information	Awareness Biannual management meetings Driver training Corrective action Naming and shaming Awards	Scoreboard to measure performance Merits offered in all round achievements KPIs Objectives and targets

	Possible solutions for mind-set and cultural changes Possible solutions for uncertainties		

5.6 ANALYSIS OF DATA: SECTION 2

5.6.1 Motivation behind providing sustainable logistics

The aim of the second section of the interview guide was to find out the motivation behind Transport Company X providing sustainable logistics. In section 3.3 of the literature review, the objective of the motivation behind providing sustainable logistics was dealt with. This enabled the researcher to derive the open-ended questions for the interview guide. The responses relating to this objective are categorised into the following themes and illustrated in Table 14. A brief explanation of the themes will be given.

Table 14: Motivation behind providing sustainable logistics

MOTIVATION	Participant A	Participant. B	Participant. C	Participant D	Participant E	Participant. F
Customers	✓	✓	✓	✓	✓	✓
Government Legislation	✓	✓			✓	✓
Competitors	✓	✓	✓	✓	✓	✓
Savings	✓	✓	✓	✓	✓	✓
Carbon Footprint	✓		✓	✓		✓
Corporate Social Responsibility	✓					✓

5.6.1.1 Customers

All participants agreed that one of the major contributing factors to providing sustainable logistics at Transport Company X can be attributed to their customers. The participants highlighted how customers were conscious of the environment and the impact logistics had on it, hence customers considered sustainable logistics as a requirement that Transport Company X must provide. This is also attributed to the fact that some of their customers were international customers, and despite being based in South Africa, they have to maintain first world standards when it comes to the environment. Participant B provided an example of one of their customers whose headquarters were overseas and they required feedback from the directors in South Africa.

"Who are the transports you are using? What other transporters are there? Do they have sustainable logistics? How are they helping the government to reduce the combustion?" (Participant B).

Customers also measure and monitor Key Performance Indicators (KPIs) of Transport Company X. Participant C, gave a scenario of a customer he works closely with on what they measure.

"We calculate on a monthly basis, be the tracking of kilometres or fuel usage, which is then sent to the third party that handles the carbon footprint" (Participant C).

5.6.1.2 Government Legislation

As mentioned previously in section 3.2.7, that adhering to government legislation could result in achieving lower costs and efficiency strategies (Prokesch, 2012:71). Some of the participants agreed with the fact that government legislation influenced the company into providing sustainable logistics. One participant said one of reasons Transport Company X introduced sustainable practices was to abide by the laws of the government. However, not all participants agreed that government legislation motivated the company to provide sustainable logistics.

"It is more of an internal drive to reduce the carbon footprint" (Participant C).

Participant D added to this statement by pointing out that the company had a voluntary system, based on responsible driving which included the carbon emission and road safety.

5.6.1.3 Competitors

The company was in a competitive industry; hence its competitors were also a drive that leads them to provide sustainable logistics so as to stay competitive. All Participants agreed that their competitors motivate the company to provide sustainable logistics. Therefore, there are various ways that Transport Company X tries to distinguish itself from its competitors. Firstly, they measured their carbon footprint and recycling on a month to month basis, to highlight the positive or negative changes if any. Secondly, the company invested widely on driver training.

"We go back to our training departments for drivers, look at the costing; look at how much of diesel has been saved per truck, per month, per year. That should differentiate ourselves with

other logistics companies, because we bring that value add or put that extra effort in going greener, trying to save combustion in South Africa" (Participant B).

The company also invested in Euro 5 engines, which apparently results in less fuel being used, and less carbon emissions, giving Transport Company X a competitive advantage. Additionally, the company was flexible when it comes to allocating a fleet to their customers. The company was able to flex up or down based on the customer's requirements and based on their environmental requirements. That is, sending a heavy duty vehicle or sending a light motor vehicle. Participant C indicated that they did this well as compared to a competitor that he previously worked for, which assigned the same fleet to a customer and it was not flexible to change for a number of years.

5.6.1.4 Savings

Sustainable logistics results in the company achieving major savings, namely cost savings and fuel savings (Ayerbe, Torres & Luna 2012:195). All participants agreed that achieving cost and fuel savings was also the reason that Transport Company X was motivated into providing sustainable logistics. The company had introduced aerodynamic trucks that reduce fuel consumption.

"By adopting green practices we actually save on fuel, which results in major cost savings" (Participant A).

The company further achieves savings through route optimisation and vehicle optimisation. This is by deciding whether the load to be transported or route to be used requires a double based truck which uses more fuel per 100kilometres or a single based truck which uses lesser fuel per 100kilometres. Therefore, these small changes or tweaks result in high fuel and cost savings for the company.

The participants highlighted that these savings resulted in the company increasing its competitive advantage. Due to the cost savings from sustainable practices, the company could offer its customers a lower rate than that of its competitors.

5.6.1.5 Carbon footprint

Not all the participants identified carbon footprint as a motivator for providing sustainable logistics. However, the participants that did, stated that it was the company's aim to reduce their carbon footprint.

"We have again initiated the recycling across all sites that helps us reduce our carbon footprint. In monitoring and measuring each site is evaluated on how much they do towards achieving this sustainable, green solutions" (Participant F).

Therefore, providing sustainable logistics resulted in the company reducing its carbon footprint. The Euro 5 engines used by the company, resulted in reduced fuel consumption, which in turn resulted in reduced carbon emissions. The participants also pointed out that driver training programmes put in place helped improve the driver's driving skills. This avoids unnecessary idling or acceleration, resulting in reduced fuel consumption and carbon emissions.

5.6.1.6 Corporate social responsibility

Transport Company X values corporate social responsibility; hence considers it as one of the factors that motivate the company to provide sustainable practices. This factor is supported by Participants A and F. The participants pointed out how the company understands how society wants to be associated with a company that values the environment.

"Also, we as an organisation have a social responsibility to give back to the community, part of that is also making sure we have green initiatives" (Participant A).

As previously discussed in section 3.2.5, that an organisation's brand is in its intangible assets such as reputation and customer loyalty (Hague, 2017:para. 5). Consequently, should a company be involved in unsustainable practices, this has the ability to become available to the public quickly and easily, damaging the reputation of the company. Therefore, Transport Company X wished to maintain a positive public image to its society.

5.7 ANALYIS OF DATA: SECTION 3

5.7.1 Benefits of providing sustainable logistics

In section 3.3 of the literature review, various benefits are listed that could be obtained from providing sustainable logistics. The participants interviewed identified some of the benefits already mentioned and also pointed out other benefits that were not covered in the literature review. The benefits identified in the findings are analysed in this section. Table 15 illustrates these benefits.

Table 15: Benefits of providing sustainable logistics

BENEFITS	Participant. A	Participant B	Participant C	Participant D	Participant E	Participant F
Reduced Carbon Footprint	✓	✓	✓	✓	✓	✓
Customer Retention	✓	✓	✓	✓	✓	✓
Positive Public Recognition	✓		✓	✓	✓	✓
Aligning with Regulations	✓	✓	✓	✓	✓	✓
Competitive Advantage	✓	✓	✓	✓	✓	✓
Future Generations	✓					✓
Vehicle Optimisation		✓			✓	✓
Tax Reductions				✓		✓

5.7.1.1 Reduced carbon footprint

Transport Company X viewed reduced carbon footprint as a benefit to the organisation. The participants all agreed that sustainable practices that have been introduced by the company have resulted in seeing reduced carbon footprint as one of the benefits. Furthermore, due to this benefit, the company had managed to see other cost reductions.

"If you look at reduced carbon footprint, it goes down to the costing of diesel per month, it goes on to the kilometres driven by the driver per month, so if you're trying to reduce the carbon footprint you are also indirectly reducing all those other cost factors" (Participant B).

Another participant highlighted that reducing the carbon footprint resulted in reduced fuel consumption, which provided sustainable logistics. He pointed out that it was optimising costs which improved the company's bottom line and enabled the company to better position themselves against their competitors.

5.7.1.2 Customer retention

All the participants agreed that customer retention was a benefit that the company experienced due to providing sustainable logistics.

"What that does, it helps us compete from a good marketing perspective, allowing us to offer a better rate, so because our costs are low due to certain or due to aerodynamics, we can quote low and as a result retain customers" (Participant F).

By the company investing in sustainable practices it enabled them to meet their customer's requirements, resulting in customer satisfaction. Customers, as mentioned previously in section 3.3.6 wanted to be associated with a reputable company or organisation that values the environment, and also is socially and economically stable. They consider these organisations as less risky, compared to organisations that can be as financially good but with a questionable reputation or image (Flatt & Kowalczyk, 2011:7).

5.7.1.3 Positive public recognition

With regard to this benefit, the participants gave examples of scenarios that resulted in the company being recognised, not necessarily on media like the newspapers or anything of that sort. Participant A, stated how Transport Company X was recognised by other business associates for introducing aerodynamic trucks.

"They mentioned to me that what Transport Company X is doing is a good job in the sense that, if you look at all the trucks, they have this aerodynamics kits" (Participant A).

This was something that even competitors and customers highlighted which in a way was positive recognition from the public. Participant C, stated how the company also got public recognition indirectly via their customers. For example, one of the company's customers gets positive recognition for the way they reduce their carbon footprint and Transport Company X is partly responsible for this as it is responsible for transporting all the recyclable waste for this customer from all its different outlets around the country. Lastly the participants also highlighted how the company got compliments from the general public when it introduced two of their trucks with the go-green campaign logo.

"If you see one or two of our trucks have the go-green logo, we did have a lot of compliments from that" (Participant F).

5.7.1.4 Aligning with regulations

The participants agreed that aligning with government requirements benefited the company. Two of the participants explicitly pointed out that aligning with government regulations resulted in the company also qualifying for specific government grants or benefits.

"Yes, we are trying to get some government benefits, for the company as well" (Participant E).

"Yes we do for obvious reasons like government grants and also to abide by the law to following fair practices, and more so realising that government is a stakeholder at the end of the day, so we always want them on our side" (Participant A).

The company recognised that the government was a stakeholder, meaning it was one of the interested and affected parties of the company. Therefore, the sustainable practices that the company does, also affect the government. To also align with government regulations, Transport Company X is TUV (Technical Inspection Association) and RTMS (Road Transport Management System) certified, which gives the company a positive image when entering into any contract.

5.7.1.5 Competitive advantage

All participants agreed that competitive advantage is one of the benefits derived from providing sustainable logistics. Customers seek organisations that value green initiatives; hence this gives Transport Company X an upper hand when it comes to bidding for tenders with their competitors. Participant A gave an example of how that works.

"So when you go and tender for them, they break it up into segments; give me your rates, give me what you do as a company in terms of your corporate social responsibility and showing what green practices you're also running" (Participant A).

Participant B emphasized on this point, adding that Transport Company X gains its competitive advantage by cutting costs not only for the company but also those of their customers.

"So we are more competitive with the rates and the best thing is we are coming with the big picture on how to save our customers money as well. So we are saving money and so are our customers" (Participant B).

Furthermore, the participants highlighted that some of their customers were international customers that required world class standards; therefore, the company was accredited for ISO 9001: 2015 to meet these standards. As stated previous in Section 3.3.7, ISO accreditation helps the company achieve producing or delivering quality products and services (Blackman

and Rivera, 2011:1177). This gives Transport Company X a competitive advantage as not all players in the industry can meet the world class standards of these customers.

5.7.1.6 Future generations

Chapter 2, Section 2.3.1 defined sustainability as the development that meets the needs of the present without compromising the ability of future generations to meet their own needs (Morelli, 2012:2). Therefore, Participant A and F pointed out that out as one of the other benefits Transport Company X considered when it came to providing sustainable logistics.

"I think one of the things we haven't talked about is us as the human beings and where we see ourselves in the future, our kids, and future generations. The earth, the ozone layers and global warming, all these things contribute to that" (Participant F).

The participants understood that being sustainable does not only benefit the business, but also impacts future generations. Therefore, the company considers the safety of future generations when it comes to the environment a benefit.

5.7.1.7 Vehicle optimisation

The aim for Transport Company X was to optimise every load that the company gets. This helps the company reduce its costs by achieving fuel savings and wage savings as use of one driver instead of multiple drivers for loads going the same route. Participant B highlighted that vehicle optimisation is essential as it is a major cost saving technique for the company.

"Look at ways and means of utilising bigger vehicles, than driving smaller trucks and doing 20 different stops. Look at it, play with it, see how best you can save money for both your side and save the money from the customer's side" (Participant B).

Vehicle optimisation also benefits the company in the sense that it saves the company's vehicles on mileage and tyres.

5.7.1.8 Tax reductions

As stated previously in Chapter 3, Section 3.3.4 that the South African government is introducing a carbon tax law to try and encourage organisation to reduce their carbon emissions. Creamer (2016:para. 4) pointed out that fewer emissions will result in less carbon tax. Participants agreed that providing sustainable logistics can result in tax reductions which is a cost saving for the company.

"We will be able to get a tax reimbursement and also, possible reduction in carbon tax, leading to cost savings when implemented" (Participant D).

5.8 ANALYSIS OF DATA: SECTION 4

5.8.1 Challenges faced in providing sustainable logistics

Chapter 3, Section 3.4 outlines some of the challenges that are faced when providing sustainable logistics. Furthermore, this section will point out some of the other challenges that the participants highlight during the collection of empirical data. Table 16 illustrates the common themes in the challenges identified.

Table 16: Challenges faced in providing sustainable logistics

CHALLENGES	Participant. A	Participant B	Participant C	Participant D	Participant E	Participant F
Lack of Resources	✓			✓	✓	✓
Different Cultural Backgrounds	✓				✓	✓
Lack of Awareness	✓			✓	✓	✓
SHEQ to be at all Sites			✓	✓		✓
Lack of 10ppm fuel					✓	✓
Customer Buy-In		✓		✓		✓

5.8.1.1 Lack of resources

Some of the participants pointed out that, lack of resources was a challenge that the company faced when it comes to fully implementing sustainable logistics. The main factor is the cost that comes with acquiring vehicles and technology that results in Transport Company X fully achieving providing sustainable logistics.

"From a resource perspective, no I don't think we have allocated enough resources to it, I don't think we have enough resources to allocate to it" (Participant A).

The few resources that the company had are not enough to fully implement sustainable logistics. Participant F emphasized that by adding that the company would welcome any help from outside to add on to the few available resources.

"If we can get more help it is welcome" (Participant F).

5.8.1.2 Different cultural backgrounds

Employees within the company were all from different cultural backgrounds. Therefore, some employees adapted to change easily, whilst others did not. As presented previously in Chapter 3, Section 3.4.6 providing sustainable logistics is not only about changing the company systems but it is also getting the employees on board with the new system, ensuring their mind-set and cultural beliefs are aligned with those of the organisation (Anderson & Anderson, 2010:6). Consequently, this was also one of the challenges that Transport Company X faces.

"Because different people come from different backgrounds and different cultures, not everyone understands the importance of this sustainability" (Participant A).

The ability to change and adapt to new ways of operations is a challenge that some employees face. The participants noted that very few employees had the ability to change right away; therefore, this affected the progress of the company in taking a sustainability step.

"If employees are not practicing sustainable logistics then it's impossible for the company to achieve that" (Participant E).

There are employees flexible to change, however, there are employees that become comfortable with what they know and are not flexible to any change. That becomes a challenge for the company.

5.8.1.3 Lack of awareness

It is important that all the information regarding the implementation of sustainable logistics is fully communicated to all the employees. Employees need to be able to answer the Five Ws and One H (Who; What; Where; When; Why; How) regarding the implementation of sustainable logistics. Employees need to be aware of why it is being done.

"When a company doesn't fully understand, yes we do it because we need to form part of legislation, however, we don't understand that if you take it and adopt it, there is a benefit as a whole" (Participant A).

Additionally, Participant D suggested that employees need to be educated about sustainable logistics, beginning with the basics, which is recycling, reusing and reducing. Also Participant B emphasized on that point, highlighting the importance of making the employees understand the reasons behind providing sustainable logistics.

"You need to make them understand the reasons behind it, and how it will benefit you in the long run. It might not benefit me as an individual, it might not benefit you, but it might benefit the future of this company" (Participant B).

Therefore, it can be concluded that since not all employees were fully aware of the reasons behind the company wanting provide sustainable logistics, they were reluctant to change.

5.8.1.4 SHEQ to be at all sites

The SHEQ department was only fully functional at head office and not across all sites. This was a challenge as the company cannot be fully sustainable when only one site was practising sustainable logistics.

"As mentioned before, SHEQ department to be at all sites to ensure the smooth flow of sustainable logistics" (Participant C).

Having SHEQ at all sites would help each site to monitor their progress in attaining sustainable practices.

"This helps each site monitor their progress in sustainable logistics, as they can compare results monthly" (Participant F).

Participant F further, highlighted how the SHEQ department measured all issues that result in the company being environmentally friendly. These include but are not limited to, paper usage, diesel consumption, kilometres travelled, PET recycled, oil recycled and tyres recycled. All of these were monitored monthly and the company can measure how well or badly it was doing using these statistics.

5.8.1.5 Lack of 10ppm fuel

To be fully sustainable, the company needed to purchase vehicles that use Euro 5 engines. This reduces emissions and results in the company having cost savings with regard to the fuel usage. However, only a specific type of fuel was used on those vehicles and it is the 10ppm (parts per million). This fuel was not common in South Africa as it was only found at one

specific filling station. Therefore, it was a challenge for Transport Company X, as they have one truck that runs on 10ppm.

"So getting the fuel is a challenge, at the moment we have one supplier. So we do have one truck that's running on 10ppm from Pietermaritzburg to Johannesburg and we fill up only at that one garage" (Participant E).

5.8.1.6 Customer buy-in

For Transport Company X to be successful in providing sustainable logistics it was beneficial if the customers were also on the same page. The company had a challenge in getting their customers to buy-in on what they are trying to achieve.

"Yes it is a challenge, trying to get the customer to buy-in on what we are trying to sell. The transporter and the customer need to be on the same page" (Participant B).

Participant A, mentioned how some of the customers were not necessarily concerned about the sustainability aspect of the company, but the delivery of goods just in time, to meet the demand in the market. Participant C further explained the concerns of most customers which made it difficult for the company to provide sustainable logistics.

"The customers are not prepared to combine loads despite having their deliveries being on the same route. For example, if we load for customer A, we can't load for customer B in the same vehicle" (Participant C).

This defeated the aim that the company had, which is vehicle optimisation. That meant the company was required to provide two separate vehicles, going on the same route and not fully utilised.

5.9 ANALYSIS OF DATA: SECTION 5

5.9.1 Overcoming the identified challenges

In determining the remedies for the identified challenges at Transport Company X, data from the semi-structured in-depth interviews and observation were used. This section will discuss the remedies identified by the different participants in overcoming the identified challenges that Transport Company X faces in providing sustainable logistics. Table 17 illustrates these remedies highlighted by the participants.

Table 17: Overcoming the identified challenges

REMEDIES	Participant. A	Participant B	Participant C	Participant D	Participant E	Participant F
Awareness	✓					✓
Bi-annual Management Meetings	✓		✓	✓		✓
Diver Training		✓				✓
Corrective Action		✓				✓
Naming and Shaming	✓	✓		✓	✓	✓
Awards		✓	✓	✓	✓	✓

5.9.1.1 Awareness

Participant A strongly believed that one of the initiatives the company had taken in overcoming the identified challenges was creating awareness. He pointed out that the SHEQ department rolled out monthly statistics that show how the company was performing with regard to the carbon footprint.

"So obviously from an awareness perspective, in fact I could put it to you in just awareness, I mean SHEQ sends out an email to us every month making us aware of what we have done to contribute to the carbon footprint. I think that in itself is an initiative making it clear and visible to everyone" (Participant A).

Participant F further supported this point by stating what was previously discussed in Section 3.5.2, that companies should ensure that their new systems or implementations are communicated clearly to the entire workforce (Stewart, 2011:53). That is creating awareness about changes that the company is trying to implement in order to achieve sustainable logistics.

5.9.1.2 Bi-annual management meetings

Another remedy that the company has put in place was having the management review meeting bi-annually. This was done to review the performance of different departments

within the company and how the managers have performed within their departments and what targets they put in place to improve on their carbon footprint.

"We integrated this into our business management system, we have a section where we discuss and make all managers aware of the carbon footprint that the company has done for the past six months, what where the targets, what we did to achieve those targets and what we have to do now" (Participant F).

Participant C also stated that in this meeting, managers shared ideas on how to overcome sustainability challenges. Ideas were shared and implemented across different departments so as to achieve the main goal as a company not just a single department.

5.9.1.3 Driver training

Participant B mentioned how the company had driver training put in place as a measure of overcoming the challenges that the company faces when it comes to providing sustainable logistics. The company understood that in order to achieve sustainable logistics, they had to train the drivers as well as they contributed to the carbon footprint.

"So if a driver speeds, we call him in for counselling and/or disciplinary action, and if he does it again we call him back in for training. At the end of the day we want our drivers to be the best professionally in this country and most importantly to have their buy-in" (Participant B).

If drivers are trained and are made aware of the importance of sustainable logistics, they are able to avoid speeding, unnecessary idling and will ensure that the vehicles they use are serviced and road worthy. This will reduce the carbon emissions from each vehicle and help the company achieve the goal of providing sustainable logistics.

5.9.1.4 Corrective action

With regard to employees, the company had corrective measures that it put in place to ensure that employees abided by the business policy statement and were on the same page with the goals and objectives set by the company. This initiative has helped the company overcome some of the identified challenges.

"How we communicate is via our business management system, via our processes and policies. If you do not implement those processes and policies we've got corrective actions in

progress. Where a corrective action is sent to his/her department stating the facts and the reasons as to why that process was breached" (Participant F).

This keeps employees aware of what is required of them with regard to the new system and ensures that achieving sustainable logistics is not just a management goal but a company objective.

5.9.1.5 Naming and shaming

Another initiative that the participants pointed out is that of naming and shaming. That was usually done in the objectives and targets meetings. Each department discussed what it has achieved and what it still needs to achieve. The carbon footprint for each department is shown, the best performing department was acknowledged and the worst performing was reprimanded using the corrective measures the company put in place.

"There's an email that is sent out, it's naming and shaming. It basically shows that this site has done this much, this site or department has done that much" (Participant C).

Participant E stated that this helped employees to improve their performance as they all wanted to be acknowledged at some point and time.

"No employee or department wants to be shamed in every objective and target meeting" (Participant E).

Hence each department performed according to the company's processes and policies to help achieve the goal of providing sustainable logistics.

5.9.1.6 Awards

Participants highlighted how the company had a merit or award system to recognise employees with outstanding performances. These did not only focus on sustainability, however, sustainability practices were also included in the grading of who is deserving of an award.

"We offer merits for any good advice that comes through, besides sustainable logistics. It's an open thing, if you come up with advice to say this will help us for our carbon emissions or whatever, you'll definitely get some point for that" (Participant D).

This initiative encouraged employees to perform to the best of their abilities so as to get an award as this is also a motivation tool. These merits or awards were not only offered to individuals but also excelling departments.

"Merits or awards are offered to the departments that excel not only in sustainability but in all areas" (Participant E).

Therefore, awards or merits resulted in departments and employees performing at a world class standard. In order to qualify for an award, employees understood that they needed to improve their performance. Participants also indicated that this resulted in Transport Company X achieving its goals and objectives of being a world class logistics company that retains customers and achieves market penetration.

5.10 FINDINGS: OBSERVATION ANALYSIS

After the literature review and the empirical study (interviews with participants at Transport Company X) was concluded, observations were made by the researcher. The researcher was able to compile an observation checklist to expand on the empirical study. This became possible as the researcher was currently an intern at Transport Company X. Therefore, this afforded the researcher the opportunity to observe the functions of Transport Company X, mainly at head office.

This section provides findings from the observation phase of the study. The presentation of the findings is broken down mainly into three tables with the relevant discussion under each table. The aim of these findings was to determine the challenges Transport Company X faces in providing sustainable logistics. The researcher notes the building design, employee compliance and vehicle sustainability.

The observation focused on one primary objective which is the challenges faced by Transport Company X in providing sustainable logistics. Hence, the findings for this objective are presented separately below and not integrated into the content analysis of the in-depth interviews.

The researcher used an observation check list that was discussed previously in Section 4.10 for evaluation. Different features were listed by the researcher, if the feature was present at Transport Company X, the researcher ticked on the Yes column. If the feature was absent the

researcher ticked on the No column and where the feature was not applicable at Transport Company X, the researcher ticked on the N/A column. A comment column was added for any necessary comments on specific observations.

Table 18 illustrates the building design of Transport Company X followed by a brief discussion of these features.

Table 18: Observing analysis of building design of Transport Company X

Activity	**Please Tick**		
	Yes	**No**	**N/A**
1. Building designed to use natural light and promote circulation of air		✓	
2. Designed to use natural renewable energy sources		✓	
3. Grey water harvesting and water recycling		✓	
4. Designed to ensure efficient use of resources such as energy and water		✓	
5. Designed to reduce environmental impact and operation costs		✓	

The features shown in Table 18 indicate the challenges that Transport Company X faced with regard to the building design. Not all offices had access to natural light or promote circulation of fresh air. The company had not yet invested in the use of renewable energy sources, for example, solar system. This led to cost increases as the company was supplied by the municipality hence incurred monthly costs with regard to the use of energy. No water harvesting or recycling techniques have been put in place. All these features resulted in Transport Company X experiencing challenges with regard to effectively providing sustainable logistics.

Table 19 presents the features at Transport Company X in relation to employee compliance.

Table 19: Observation analysis of employee compliance at Transport Company X

Activity	**Please Tick**		
	Yes	**No**	**N/A**
1. Do employees follow the environmental regulations within the company		✓	

2. Do employees understand the recycle, reduce and reuse techniques		✓	
3. Do employees dispose oils and all materials used in the workshop in an environmentally friendly manner	✓		
4. Is proper clothing attire worn at different sites factoring in safety and environmental measures	✓		
5. Does SHEQ communicate environmental concerns fully to employees		✓	

Features from Table 19 present the employee compliance within the company. Not all employees fully understood the environmental regulations; hence this resulted in fewer employees practising sustainability. Recycle bins were placed at different departments all over the building, however, employees still did not comply with these. It was very common to find paper in a plastic labelled bin. However, observing the workshop department of the company, employees there seemed to know more about the environment, therefore, follow environmental friendly ways of disposing of oils and materials used in the workshop. The biggest challenge that the company faces is that the SHEQ department did not fully communicate the environmental issues to the employees. A newsletter stating environmental and green issues was rolled out every month, but the SHEQ department needed to break these down in a way that every employee was on the same page.

Table 20 presents the features of vehicle sustainability within Transport Company X.

Table 20: Observation analysis of vehicle sustainability at Transport Company X

Activity	**Please Tick**		
	Yes	**No**	**N/A**
1. Does Transport Company X have driverless vehicles		✓	
2. Does the company use Euro 5 engines	✓		
3. Are the trucks equipped with aerodynamics	✓		
4. Are the trucks using eco-friendly tyres	✓		
5. Do the trucks use eco-friendly fuel		✓	

The features shown in Table 20 highlight all the vehicle sustainability of the company. Transport Company X did not have any driverless vehicles as yet. However, the company did

have Euro 5 engines that resulted in less carbon emissions. Furthermore, all the trucks were equipped with aerodynamics. This helped with speed reduction and reduced the fuel consumption of each vehicle. The company's tyre supplier recently introduced eco-friendly tyres and the company was changing tyres for their vehicles to these eco-friendly tyres. However, the eco-friendly fuel available for the euro 5 engines was still scarce in South Africa (discussed in section 5.8.1.5) as there was only one supplier; hence, only one truck utilised the 10ppm fuel in the company.

5.11 SUMMARY

Chapter 5 presented the data analysis for this study. The chapter began by revisiting the primary objectives of this study and indicating where these objectives are addressed in the chapter.

The chapter provided a brief background of Transport Company X and the demographics of the participants were also briefly highlighted. These included the positions held within the company and the role of each participant plays within their department.

Furthermore, data analysis followed. Consideration was given to the responses from each of the participants that were interviewed. Different themes and codes were identified and developed to arrange the empirical data in an orderly and meaningful manner. To expand on the interviews, observations were done by the researcher and the findings are summarised in the last section of this chapter.

The next chapter, Chapter 6 concludes this study by summarising the main findings. Each objective will be examined separately, revisiting both the literature review and the empirical data in order to draw conclusions and make recommendations.

CHAPTER 6

SUMMARY, RECOMMENDATIONS AND SUGGESTIONS FOR FUTURE RESEARCH

6.1 INTRODUCTION

Previous chapters presented the problem statement, research questions and objectives, literature review and empirical data. Chapter 5 discussed the findings of the empirical data collected through semi-structured in-depth interviews and observations. This concluding chapter presents the summary of the study, recommendations and suggestions for future research.

The primary objective for this study was to determine the benefits and challenges that Transport Company X faces when providing sustainable logistics, and to determine the remedies the company has in place to overcome these challenges. This chapter serves as a comprehensive summary for this study. Each objective is examined individually by reviewing the literature and the empirical findings, drawing conclusions and providing recommendations on how to overcome the identified challenges. After revisiting each objective, the chapter then concludes by discussing the limitation of the study and providing suggestions for future research on similar topics.

6.2 REFLECTING ON THE RESEARCH QUESTIONS AND OBJECTIVES

This chapter reflects on the main research questions and objectives of the study. A basis for this study was formed from these questions and objectives and it is important to highlight how they have been achieved during the course of the study. Some of the objectives were met during the collecting of secondary data in the literature review, while some of the objectives were met during the collection of empirical data through semi-structured in-depth interviews.

A recap of the main research questions and objectives of this study is illustrated in Table 21.

Table 21: Reflecting on the main research questions and objectives

RESEARCH QUESTIONS	RESEARCH OBJECTIVES
1. What is the motivation behind Transport Company X providing sustainable logistics?	1. To provide insight into the motivation behind Transport Company X providing sustainable logistics.
2. What benefits does Transport Company X derive from providing sustainable logistics?	2. To identify the benefits that Transport Company X derives from providing sustainable logistics.
3. What are the challenges that Transport Company X experiences in providing sustainable logistics?	3. To identify the challenges that Transport Company X experiences in providing sustainable logistics.
4. How does Transport Company X overcome these identified challenges?	4. Determine how Transport Company X overcomes the identified challenges.

The next section of this chapter provides a discussion of each objective, how it has been achieved or met and how each has contributed towards addressing the main research problem presented in this study.

6.2.1 Objective 1: Motivation behind Transport Company X providing sustainable logistics

The first primary objective of this study was to determine the motivation behind Transport Company X providing sustainable logistics. This objective was achieved through the empirical data. The empirical data, consisted of semi-structured in-depth interviews using an interview guide. The interview guide was drafted based on the theoretical framework derived from the findings of the literature review in terms of the objectives of the study. The interview guide used and designed for this empirical study is included as Appendix C.

The findings of this objective included the following themes which are, customers, government legislation, competitors, savings, carbon footprint and corporate social responsibility. With regard to customers, the empirical data highlighted how most customers wanted to be associated with a company that values green initiatives. Government also requires that companies follow regulations that result in green practices to reduce the carbon footprint. This results in savings, namely cost savings and fuel savings. If the company fully achieves these savings they are able to offer their customers a cheaper rate as compared to

their competitors, giving it a competitive advantage. The company also values corporate social responsibility as this gives the company a positive public image.

6.2.2 Objective 2: Benefits Transport Company X derives from providing sustainable logistics

The second primary objective of this study was to highlight the benefits Transport Company X derived from providing sustainable logistics. This objective was achieved through empirical data. Semi-structured in-depth interviews at Transport Company X were conducted to get findings for this objective.

The findings for this objective included the following themes which are, reduced carbon footprint, customer retention, and positive public recognition, aligning with regulations, competitive advantage, future generations, vehicle optimisation and tax reductions. Providing sustainable logistics resulted in the company achieving reduced carbon footprint, reducing costs. This allowed the company to offer lower rates to their customers achieving customer retention and having a competitive advantage over their competitors. The company gets public recognition, not necessarily from the media but from their customers from all the changes they have made in order to successfully implement sustainable logistics. Automatically, the company aligned with government regulations and enjoyed the benefits of tax deductions. Sustainability, also benefited the company through vehicle optimisation. Lastly, the company benefited not only in business terms but by ensuring that future generations can still operate in an environmentally friendly atmosphere.

6.2.3 Objective 3: Challenges that Transport Company X experiences in providing sustainable logistics

The third objective of this study was to identify the challenges that Transport Company X experienced in providing sustainable logistics. The objective was achieved through semi-structured in-depth interviews at Transport Company X, along with a structured, participant observation in the company. The observation checklist was drawn up before conducting the observation. A copy of the checklist is attached to this study as Appendix D.

The empirical data indicated that the challenges the company faced include lack of resources, different cultural backgrounds, lack of awareness, SHEQ to be at all sites, lack of 10ppm fuel and customer buy-in. The company did not have enough resources to fully implement the sustainability practices. Cultural backgrounds made it difficult for all employees to comply

with new changes in the company; some employees were reluctant to change. Lack of awareness and not having the SHEQ department at all sites also became a challenge, as employees were not fully informed about the importance of sustainability and the reasons behind the company wanting to provide sustainable logistics. Getting the specific fuel for the Euro 5 engines was a challenge as there was only one supplier currently in the country. Getting the customer's buy-in was another challenge as most customers were more concerned about their products being delivered on time than worrying about how they can contribute to the sustainability of the company.

From the observation at Transport Company X, the researcher noted that the company had not invested in the proper building structure. The building design did not support the sustainability practices that the company needed to implement. Employees were not willing to comply easily with new terms despite those terms leading to sustainable logistics. Some employees were comfortable with their current work processes and they were not willing to conform to new standards. Lastly, the company had not fully achieved obtaining sustainable vehicles; however, most of the vehicles have sustainable features implemented.

6.2.4 Objective 4: How Transport Company X overcomes the identified challenges

The fourth and last objective of this study was to determine the remedies Transport Company X has put in place to overcome the challenges identified. This objective was achieved through semi-structured in-depth interviews at Transport Company X.

The findings of the empirical study indicate that the remedies for overcoming the identified challenges included awareness, bi-annual management review meetings, driver training, corrective action, naming and shaming and award ceremonies. The company tried to make their employees aware of sustainable logistics through SHEQ roll-out meetings. Management review meetings that were also held twice a year for each manager to give an update of the achievement within his/her department. If a driver was slackening there was training provided, and should the driver be reported for bad driving on more than one occasion there were corrective measures that were applied. This also applied to all employees, not just the drivers. The company had objectives and targets meetings that were done monthly. This was where there was naming and shaming, where each department's performance was exposed to the entire company. Employees and departments performing well were rewarded based on their different performances. These awards were not only limited to sustainability, but for performing well throughout their assigned roles.

The following sections consider the recommendations for the primary objectives, the limitations to the study and the areas for further research.

6.3 RECOMMENDATIONS

The primary problem statement of this study was to identify the benefits and challenges Transport Company X experiences when providing sustainable logistics and how to overcome the identified challenges. The previous chapter, Chapter 5 discussed the findings obtained from the semi-structured in-depth interviews and observations. This section includes recommendations on how the identified challenges could be addressed. The section outlines all the factors for each objective (from both the literature review and empirical data) and the recommendations on how each can be fully achieved.

Table 22 presents the first objective and recommendations followed by a brief discussion of possible outcomes when adopting the recommended remedies.

Table 22: Motivation behind providing sustainable logistics and recommendations

Literature Findings	**Empirical Findings**	**Recommendations**
The literature review discussed the motivation behind providing sustainable logistics in the Logistics industry. This is briefly recapped as follows: • Desire to do the right thing (Lieb & Lieb 2013:525; Pullman, Maloni & Carter 2009:40; Hofman *et al.* 2014:165). • Pressure from customers (Collins, Steg & Koning 2010:560; Sharfman, Shaft & Anex 2009:5; The Rep 2018: para 3). • Desire to attract green customers (Sarigollu	Below are the main motivations behind providing sustainable logistics findings after conducting interviews at Transport Company X: • Customers (Section 5.6.1.1) • Government legislation (Section 5.6.1.2) • Competitors (Section 5.6.1.3) • Savings section (Section 5.6.1.4) • Carbon footprint (Section 5.6.1.5) • Corporate Social Responsibility (Section 5.6.1.6)	• Transport Company X should make sustainability a requirement for each department in order to achieve “doing it right the first time”. • The company should instil sustainable logistics into its culture and not do it because of pressure from customers or government legislation, because if these are then removed the company loses its motivation of practising sustainable logistics. • The company can make it

2009:366; Ali *et al.*, 2011:218; Manaktola & Jauhari 2011: 366). • Competitive pressures (Mishra & Sharma 2010: 11; Ayerbe, Torres & Luna 2012: 195). • Brand value (Hague 2017: para 5; Preuss, 2011: 347-8). • Misuse of resources (Dey, LaGuardia & Srinivasan 2011: 1241; Dutton 2012: 30). • Government intervention (The Carbon Footprint 2015: para 3; United Nations Environmental Program 2010: para 3; Prokesch 2012: 71). • International standards and regulations (Dey, LaGuardia & Srinivasan 2011: 1242; Kameyama and Kubota 2013: 3; European Commission 2010: para. 3; UNFCCC 2010: 9; Giddens 2013: 36; Center for American Progress, 2011: para. 7).		mandatory for every department to report on their sustainable logistics initiatives in order to enhance visibility throughout the company. It is important to communicate the gain the company gets from providing sustainable logistics so that employees can see the motivation behind providing sustainable logistics.

Possible outcomes that could be achieved if the recommendations were to be taken into consideration include well sustainable-cultured employees, fully understanding the need to provide sustainable logistics and understanding the motivation behind Transport Company X wanting to provide sustainable logistics.

Table 23 presents the second objective and recommendations followed by a brief discussion of possible outcomes when adopting the recommended remedies.

Table 23: Benefits derived from providing sustainable logistics and recommendations

Literature Findings	Empirical Findings	Recommendations
The literature review discussed the benefits derived from providing sustainable logistics in the Logistics industry. This is briefly recapped as follows: • Reducing emissions (The European Commission 2017: para 1). • Reducing the amount of waste products (Woinowski 2013: para 2). • Reducing the amount of energy consumed (Garlos *et al.,* 2015: 41; Odhams *et al.,* 2010: 1997; Gardiner 2014: para 4). • Alignment with government regulations and goals (Ramanathan, Bentley & Pang 2014:231; Inspirage 2017:para 1; Creamer 2016:para 4). • Increasing awareness among customer base (OECD 2012:7; Boulanger 2010:7). • Customer satisfaction (Lombart & Louis 2012:645; Gallarza, Gil-Saura & Holbrook	The following are the main benefits of providing sustainable logistics derived by Transport Company X identified during interviews with participants from the company: • Reduced carbon footprint (Section 5.7.1.1) • Customer retention (Section 5.7.1.2) • Positive public recognition (Section 5.7.1.3) • Aligning with regulations (Section 5.7.1.4) • Competitive advantage (Section 5.7.1.5) • Future generations (Section 5.7.1.6) • Vehicle optimisation (Section 5.7.1.7) • Tax reductions (Section 5.7.1.8)	• Transport Company X should communicate clearly all the benefits the company derives from providing sustainable logistics to both its customers and employees. This creates transparency and a desire to fully cooperate with the company's sustainability drive as both parties will know and see the benefits. • Environmental facilities onsite should be upgraded or improved in order for the company to maximise providing sustainability and run its processes effectively and efficiently. This will enable Transport Company X to lower its waste and emission generation rates.

2011:181; Flatt & Kowalczyk 2011:7). • Quality (Blackman & Rivera 2011:1177; Eilperin 2010:2; Saedi *et al.*, 2015:344). • Innovation (Jacobi & Giatti 2017:2; Seebode, Jeanrenaud & Bessant 2012:200).		

Possible positive outcomes that could be achieved if the recommendations were to be applied to the company include fully informed employees and customers that will help the company achieve its sustainability drive, effectiveness and efficiency will be achieved through improving the environmental facilities in the company.

Table 24 presents the third objective and recommendations followed by a brief discussion of possible outcomes when adopting the recommended remedies.

Table 24: Challenges experienced in providing sustainable logistics and recommendations

Literature Findings	**Empirical Findings**	**Recommendations**
The literature review discussed the challenges experienced in providing sustainable logistics in the Logistics industry. This is briefly recapped as follows: • Estimating hidden costs (Anderies *et al.*, 2013:3). • Lack of clear definitions (Gittel, Magnusson & Merenda 2012:26). • Integration into the management system	The following are the main challenges experienced when providing sustainable logistics at Transport Company X identified during interviews with participants from the company and through observations: **Interviews:** • Lack of resources (Section 5.8.1.1) • Different cultural	• Transport Company X can minimise carbon emissions by ensuring that all vehicles are loaded to maximum capacity. If vehicles are under-loaded it leads to multiple trips which could all be on the same route, resulting in carbon emissions. • The company should have environmental campaigns

(Hardcastle 2013:para 5; Lacy, Arnott & Lowitt 2013:485). • Potential barriers to trade (World Trade Organisation 2015:1). • Insufficient and incomparable environmental information (Perron 2015:558; Govindad *et al.*, 2014:559). • Mind-set and cultural changes (Anderson & Anderson 2010:6; Stubbs & Cocklin 2010:210). • Uncertainties (Menassa 2011:3576; Govindad e*t al* 2014:559; Vezzoli *et al* 2015:3).	backgrounds (Section 5.8.1.2) • Lack of awareness (Section 5.8.1.3) • SHEQ to be at all sites (Section 5.8.1.4) • Lack of 10ppm fuel (Section 5.8.1.5) • Customer buy-in (Section 5.8.1.6) **Observation:** • Building design of Transport Company X (Section 5.10) • Employee compliance (Section 5.10) • Vehicle sustainability (Section 5.10).	that will educate both customers and employees, especially employees so they are flexible to changes that result in an environmentally friendly atmosphere. • The company to use container liners instead of refrigerated trucks to improve the environment and save on energy usage. • Lastly the company should use the most direct routes, improve their aerodynamic vehicles and use fuel efficient vehicles.

Possible positive outcomes that could be achieved if the recommendations were to be applied to the company include an environmentally friendly company with employees that are well educated about the need to operate in an environmental manner. Vehicle optimisation and using fuel efficient vehicles will result in cost savings. These costs can be redirected into investing in resources that are required in order to achieve sustainable logistics fully.

Table 25 presents the fourth objective and recommendations followed by a brief discussion of possible outcomes when adopting the recommended remedies.

Table 25: Overcoming the identified challenges

Literature Findings	**Empirical Findings**	**Recommendations**
The literature review discussed the remedies for overcoming the identified challenges	The following are the main remedies for overcoming the identified challenges identified	• In addition, monthly training programmes can be implemented to enhance

experienced in providing sustainable logistics in the Logistics industry. This is briefly recapped as follows: • Possible solutions for estimating hidden costs (Stewart 2011:52; Ni, Zhang & Souryal 2011:47). • Possible solutions for lack of clear definitions (Stewart 2011:53; Milway & Saxton 2011:para. 10). • Possible solutions for integrating in management system (Sanchez 2015:319; Epstein & Buhovac 2014:13). • Possible solutions for potential barriers to trade (Vineetha & Babu 2014:2; Guo, Pan & Fang 2012:1595). • Possible solutions for insufficient and incomparable environmental information (Chandra 2015:6; Islam 2016:31). • Possible solutions for mind-set and cultural changes (McGuire *et al.* 2015:5; Butman 2013:para.11). • Possible solutions for uncertainties (Grote 2012:11; Pepper 2012:para. 12).	during interviews with participants from Transport Company X: • Awareness (Section 5.9.1.1) • Bi-annual Management Meetings (Section 5.9.1.2) • Driver training (Section 5.9.1.3) • Corrective action (Section 5.9.1.4) • Naming and shaming (Section 5.9.1.5) • Awards (Section 5.9.1.5).	knowledge sharing on environmental tips within the company. • Employees, should be given the platform to share their views on different sustainability techniques that the company can adopt. This will result in diversified options which the company can choose from. • The company can replace pallets with slip sheets as these are lighter, environmentally friendly and easily recyclable. Transport Company X can also invest in solar energy and green heating and cooling systems that run on solar power. This will save costs as solar power is a renewable energy source.

Possible positive outcomes that could be achieved if the recommendations were to be applied to the company include an environmentally friendly company that has employees contributing fully to the sustainability of the company. Employees will be motivated to come up with valid suggestions as those will be recognised and applied to the company's environmental system.

6.4 LIMITATIONS OF THE STUDY

There are various limitations that could have hindered the researcher from finding out all information needed for this study. This information can be discovered should the study be conducted elsewhere. For example, in this research, the limitations are outlined as follows;

- This study focused on one logistics provider only. Other logistics providers in South Africa were not included in this study, therefore, this means that the findings of the study cannot be generalised for all the logistics providers. Furthermore, focusing on a single case limits the scope of the study.
- Benefits and challenges were identified through the literature review and interviews with participants of the participating company; therefore, it is likely that not all the benefits derived or challenges faced by Transport Company X from providing sustainable logistics were identified.
- Furthermore, since not much research has been done on the study at hand, the researcher had to depend on secondary data to gather the necessary information. Some of this secondary data does not cover the topic fully or in a comprehensive manner as compared to what the researcher was really looking for.

6.5 AREAS FOR FUTURE RESEARCH

The following possible research focus areas were identified by the researcher during the course of this study. These focus areas could provide more insight into the benefits and challenges of providing sustainable logistics in the transport industry in South Africa.

- There is an assumption that has been made that the cost or investing in environmental activities is high and the returns are low, and is over a long period of time. This makes it a

challenge for most companies to adopt sustainability practices because the benefits are not visible to the naked eye. Therefore, more research should be conducted based on successful companies that have adopted green practices. These results should be shown as case studies to eliminate this assumption and provide solutions for this challenge.

- Unlike first world countries, South Africa still lacks full knowledge and resources to fully adapt to environmentally friendly operations. Therefore, research and studies can be tackled to provide possible incentives or government support that can encourage companies to practice sustainable logistics fully.
- Logistics companies in South Africa are the main link between suppliers and customers. This means they are in a critical role to drive green, sustainability initiatives in the total supply chain. Therefore, logistics companies should be encouraged to participate in these green sustainability studies so that information sharing can be established and a database can be created on how to provide sustainable logistics effectively in South Africa. This database should clearly show the benefits derived from providing sustainable logistics.
- A similar study should be conducted focusing on a different logistics company to determine if logistics industries in South Africa are facing similar sustainable logistics benefits and challenges.

6.6 CONTRIBUTION OF THE RESEARCH STUDY

The research study adds to the application of sustainable logistics in the transport and logistics industry in South Africa, however paying particular focus to the benefits derived and challenges experienced in providing sustainable logistics at Transport Company X. The benefits and challenges identified have an impact on the performance and competitiveness of Transport Company X, who plays an important role in the transport and logistics industry in South Africa.

Recommendations were provided to Transport Company X. However, these recommendations can be applied by any other transport companies in South Africa, as they try and address their identified challenges. Furthermore, studies can be conducted on this topic and developed in future research.

The field of sustainable logistics is wide, thus this study of the literature review and findings of the empirical research contribute to the body of knowledge and provide a new insight into this field.

6.7 CONCLUDING REMARKS

This study is both exploratory and descriptive. Through the literature review, it was highlighted that South African transport and logistics companies derived certain benefits and experience challenges in providing sustainable logistics. This was further confirmed by the participants from Transport Company X during the interview process.

This chapter (Chapter 6) started by reflecting on the research questions and objectives as these form the basis of this study (see Table 6.1). In addition, this chapter highlighted the findings from both the literature research and empirical research of each objective. Possible recommendations were provided. This chapter concluded with limitations of the study, areas of further research in the similar subject and contribution of the research.

The findings indicate that Transport Company X did acquire some benefits from providing sustainable logistics; these included reduced carbon footprint, customer retention, and positive public recognition, aligning with government regulations, competitive advantage, future generations, vehicle optimisation and tax reductions. Recommendations were suggested on how the company could further benefit from providing sustainable logistics. These included transparency among employees and customers to ensure they are fully aware on the need of being sustainable and participate in contributing to sustainable logistics. Also improving available environmental facilities so as to improve and ensure the smooth flow of sustainable logistics.

However, findings revealed that Transport Company X experienced some challenges in providing sustainable logistics. These challenges include lack of resources, different cultural backgrounds, lack of awareness, SHEQ not available at all sites, lack of 10ppm fuel, customer buy-in, building design, employee compliance and vehicle sustainability. Recommendations that were suggested to overcome these identified challenges include vehicle optimisation, resulting in reduced carbon emissions, environmental campaigns to educate employees on the importance of sustainable logistics, use of container liners instead of refrigerated trucks to save on energy usage and environmentally friendly. Lastly, the

company could use direct straightforward routes and improve the aerodynamics of the trucks and use fuel efficient vehicles.

Whilst there are numerous benefits and challenges faced by transport companies in South Africa, companies such as Transport Company X are constantly coming up with new strategies to fully benefit from providing sustainable logistics and to find remedies to overcome the challenges experienced when providing sustainable logistics.

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APPENDICES

APPENDIX A: INTERVIEW GUIDE

INTERVIEW GUIDE

Date: _____

Company: _____

Participant: _____

1. INTRODUCTION

The aim of this study is to find out the reason why Transport Company X provides sustainable logistics.

Participants are assured of confidentiality and permission is requested to use a digital voice recorder to record the interview.

2. SECTION 1: COMPANY PROFILE

- Name of participant: _____
- Position: _____
- Years in the Company
- Age group: 21-30 31-40 41-50 51-60 60+
- What is your qualification? (optional) _____
- What are your main duties or roles in the company?

  _____

- What is the total number of employees in the company?

  _____

- What quality accreditations do you have in terms of sustainability?

  _____

3. SECTION 2: MOTIVATION BEHIND PROVIDING SUSTAINABLE LOGISTICS

- What was/were the reasons for Transport Company X to implement sustainable logistics practices?
- Is government legislation one of the reasons Transport Company X implemented sustainable logistics practices? Please can you elaborate on this question?
- For how long have you been practicing sustainable logistics?
- Are your competitors also practicing sustainable logistics?
- If so, how do you distinguish yourself as a company from them?
- Do your customers influence your practices on sustainable logistics? Please can you elaborate on this question?
- Are you achieving sustainable logistics? How?

4. SECTION 3: BENEFITS OF SUSTAINABLE LOGISTICS

- Do you consider reduced carbon footprint as a benefit of providing sustainable logistics?
- Does sustainable logistics help you retain your customers?
- Have you gained any positive public recognition from providing sustainable logistics?
- Do you consider aligning with government requirements/ regulations a benefit for your organisation?
- Have you set any targets regarding sustainable logistics? If yes, what targets are you hoping to achieve?
- Does providing sustainable logistics give you a competitive advantage?
- Are there any other benefits obtained from providing sustainable logistics to customers other than the ones already listed?

5. SECTION 4: CHALLENGES FACED IN PROVIDING SUSTAINABLE LOGISTICS

- How was sustainable logistics integrated into the organisation's management system?
- Does the organisation have enough resources to implement sustainable logistics?

- What are the main challenges faced when it comes to making sure that the employees comply with sustainable logistics?
- What challenges does the organisation face when it comes to ensuring that their customers comply with sustainable logistics?
- So far, how successful has the company been in implementing sustainable logistics throughout the entire organisation?
- What are the main challenges that are faced when providing sustainable logistics?

6. SECTION 5: OVERCOMING THE IDENTIFIED CHALLENGES

- What initiatives has the company taken to overcome the above identified challenges?
- Is there any form of training within the organisation that has been organised to mitigate these challenges?
- What measures has the organisation implemented to deal with the challenges faced with their customers?
- How did the organisation communicate with their employees to ensure that all challenges are addressed?
- Does the organisation have a score board on the achievements of sustainable logistics?
- Does the organisation offer merits/awards or any form of recognition to departments that excel in working towards sustainable logistics?

Thank you for your time and effort. It is greatly appreciated.

APPENDIX B: INFORMED CONSENT FORM

UKZN HUMANITIES AND SOCIAL SCIENCES RESEARCH ETHICS COMMITTEE (HSSREC)

APPLICATION FOR ETHICS APPROVAL
For research with human participants

Information Sheet and Consent to Participate in Research

Date: 10 May 2018

Greetings,

My name is Babongile Mabhena, Student number (210532822) from School of Management, IT and Governance, University of KwaZulu-Natal. Contact details: Cell: +27 (0) 81 216 5045, email: 210532822@stu.ukzn.ac.za

You are being invited to consider participating in a study that involves a research titled "'Benefits and challenges of providing sustainable logistics: A case at a South African Logistics Company".

The aim and purpose of this research is:
(1) to provide insight as to the motivation behind your organisation providing sustainable logistics to its customers;
(2) to identify the benefits your organisation derives from providing sustainable logistics to its customers;
(3) to identify the challenges that your organisation experiences in providing sustainable logistics to its customers and;
(4) to determine how your company overcomes the identified challenges.

The study will involve conducting semi-structured in-depth interviews. The duration of your participation will be 30 minutes. If you choose to participate and remain in the study, it is envisaged that detailed insight into the benefits and challenges of providing sustainable logistics will be provided. This is a self-funded study.

Once the findings are complete we will suggest recommendations as to how the logistics industry can overcome the challenges it faces when implementing sustainable practices or sustainable logistics. The study will provide no direct benefits to participants.

This study has been ethically reviewed and approved by the UKZN Humanities and Social Sciences Research Ethics Committee.

In the event of any problems or concerns/questions you may contact the researcher at (Cell: +27 (0) 81 216 5045, email: 210532822@stu.ukzn.ac.za), My supervisor Professor M.J.

Naude Tel: +27 (0) 33 260 6181, email: naudem@ukzn.ac.za or the UKZN Humanities & Social Sciences Research Ethics Committee, contact details as follows:

HUMANITIES & SOCIAL SCIENCES RESEARCH ETHICS ADMINISTRATION
Research Office, Westville Campus
Govan Mbeki Building
Private Bag X 54001
Durban 4000 KwaZulu Natal, SOUTH AFRICA
Tel: 27 31 2604557 – Fax: 27 31 2604609
Email: HSSREC@ukzn.ac.za

Your participation in the study is voluntary and by participating, you are granting the researcher permission to use your responses. You may refuse to participate or withdraw from the study at any time with no negative consequence. There will be no monetary gain from participating in the study. Your anonymity will be maintained by the researcher and the School of Management, I.T. & Governance and your responses will not be used for any purposes outside of this study.

All data, electronic and hard copies will be securely stored during the study and archived for 5 years. After this time, all data will be destroyed.

If you have any questions or concerns about participating in the study, please contact me or my research supervisor at the numbers listed above.

Sincerely

Babongile Mabhena

_____

CONSENT TO PARTICIPATE

I (Name) _____ have been informed about the study entitled "Benefits and challenges or providing sustainable logistics: A case study at a South African Logistics Company" by Babongile Mabhena.

I understand the purpose and procedures of the study.

I have been given an opportunity to ask questions about the study and have had answers to my satisfaction.

I declare that my participation in this study is voluntary and that I may withdraw at any time without affecting any of the benefits that I usually am entitled to.

If I have any further questions/concerns or queries related to the study I may contact the researcher at cell: +27 (0) 81 216 5045 or alternatively email: 210532822@stu.ukzn.ac.za

If I have any questions or concerns about my rights as a study participant, or if I am concerned about any aspect of the study or the researcher I may contact:

HUMANITIES & SOCIAL SCIENCES RESEARCH ETHICS ADMINISTRATION
Research Office, Westville Campus
Govan Mbeki Building
Private Bag X 54001
Durban
4000
KwaZulu Natal, SOUTH AFRICA
Tel: 27 31 2604557 – Fax: 27 31 2604609
Email: HSSREC@ukzn.ac.za

Additional consent, where applicable

I hereby provide consent to:

Audio-record my interview YES / NO

_____ _____
Signature of Participant **Date**

_____ _____
Signature of Witness **Date**

(Where applicable)

_____	**_____**
Signature of Translator (Where applicable)	**Date**

APPENDIX C: OBSERVATION CHECKLIST

Observation Checklist at Transport Company X

This checklist was done so as to focus on the specific activities aimed at answering the research objections.

1. Checklist shows different features, if feature is present the researcher ticked on the Yes column, If the feature was absent the researcher ticked on the No column and where the feature was not applicable, the researcher ticked on the N/A column.
2. A comment column was added for any necessary comments on specific observations.

Activity	**Please Tick**			**Comment**
	Yes	**No**	**N/A**	
Observing analysis of building design of Transport Company X				
6. Building designed to use natural light and promote circulation of air		✓		
7. Designed to use natural renewable energy sources		✓		
8. Grey water harvesting and water recycling		✓		
9. Designed to ensure efficient use of resources such as energy and water		✓		
10. Designed to reduce environmental impact and operation costs		✓		
Observation analysis of employee compliance at Transport Company X				
11. Do employees follow the environmental regulations within the company		✓		
12. Do employees understand the recycle, reduce and reuse techniques		✓		
13. Do employees dispose oils and all materials used in the workshop in an environmentally friendly manner	✓			
14. Is proper clothing attire worn at different sites factoring in safety and environmental measures	✓			

15.	Does SHEQ communicate environmental concerns fully to employees		✓		
	Observation analysis of vehicle sustainability at Transport Company X				
16.	Does Transport Company X have driverless vehicles		✓		
17.	Does the company use Euro 5 engines	✓			
18.	Are the trucks equipped with aerodynamics	✓			
19.	Are the trucks using eco-friendly tyres	✓			
20.	Do the trucks use eco-friendly fuel		✓		

APPENDIX D: EDITOR'S STATEMENT

EDITING STATEMENT

18 November 2018

I have proof read the dissertation,

BENEFITS AND CHALLENGES OF PROVIDING SUSTAINABLE LOGISTICS: A CASE AT A SOUTH AFRICAN LOGISTICS COMPANY

Student: **Babongile Mabhena**

Student Number: 210532822

I have made suggestions regarding
Spelling, Punctuation, Grammar, Formatting, Referencing, Bibliography and Style.

Gavin Walter Storrie
B A (Hons) U.E.D.

GWStorrie

g.storrie@gmail.com

APPENDIX E: ETHICAL CLEARANCE

UNIVERSITY OF KWAZULU-NATAL
INYUVESI YAKWAZULU-NATALI

25 May 2018

Ms Babongile Mabhena (210532822)
School of Management, IT & Governance
Pietermaritzburg Campus

Dear Ms Mabhena,

Protocol reference number: HSS/0497/018M
Project Title: Benefits and challenges of providing sustainable logistics: A case at a South African Logistics Company

Approval Notification – Expedited Application

In response to your application received 21 May 2018, the Humanities & Social Sciences Research Ethics Committee has considered the abovementioned application and the protocol has been granted **FULL APPROVAL.**

Any alteration/s to the approved research protocol i.e. Questionnaire/Interview Schedule, Informed Consent Form, Title of the Project, Location of the Study, Research Approach and Methods must be reviewed and approved through the amendment /modification prior to its implementation. In case you have further queries, please quote the above reference number.

PLEASE NOTE: Research data should be securely stored in the discipline/department for a period of 5 years.

The ethical clearance certificate is only valid for a period of 3 years from the date of issue. Thereafter Recertification must be applied for on an annual basis.

I take this opportunity of wishing you everything of the best with your study.

Yours faithfully

.....
Dr Shamila Naidoo (Deputy Chair)

/ms

Cc Supervisor: Professor MJ Naude
Cc Academic Leader Research: Professor Isabel Martins
Cc School Administrator: Ms Debbie Cunynghame

Humanities & Social Sciences Research Ethics Committee
Professor Shenuka Singh (Chair)
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Website: www.ukzn.ac.za